

September 30, 2019

Pennsylvania SERS 401(a)



**Investment Measurement Service
Quarterly Review**

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U.S. EQUITY

U.S. equity markets posted mixed results amid a market that saw 30-year Treasury yields hit historic lows and the most meaningful, albeit short-lived, factor rotation among equities since the Global Financial Crisis (GFC). Large cap (+1.4%) and mid cap stocks (+0.5%) posted modest gains for the quarter while small caps declined (Russell 2000: -2.4%). Ongoing U.S.-China trade tension, earnings and interest rate uncertainty, and the global political landscape continued to drive investor uncertainty.

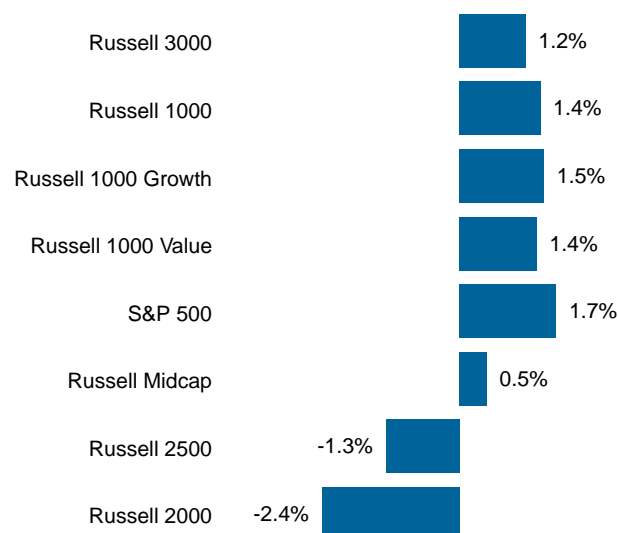
Large Cap U.S. Equity (S&P 500: +1.7%; Russell 1000: +1.4%)

- Top sectors were in defensive areas including Utilities (+9.3%), Real Estate (+7.7%), and Consumer Staples (+6.1%) in response to investors' continued flight to quality.
- Energy, hurt by falling oil prices, fell 6.3%; Health Care lagged (-2.2%) amid discussions around price transparency and pricing reform by U.S. presidential candidates.
- Cyclical sector exposure has been volatile given uncertainty around the trade deal (and continued sideways movement of markets) along with slowed global growth.
- Up to September, momentum stocks (which have shifted to include many of the market's least volatile stocks) outperformed as investors shunned the cheapest quintile of value (and more volatile) stocks. This trend sharply reversed in early September as the 10-year Treasury yield rose from 1.46% to 1.73% and momentum stocks fell precipitously while value stocks traded up over the course of two days. The magnitude of the reversal gave a boost to value stocks across market capitalizations for the quarter.

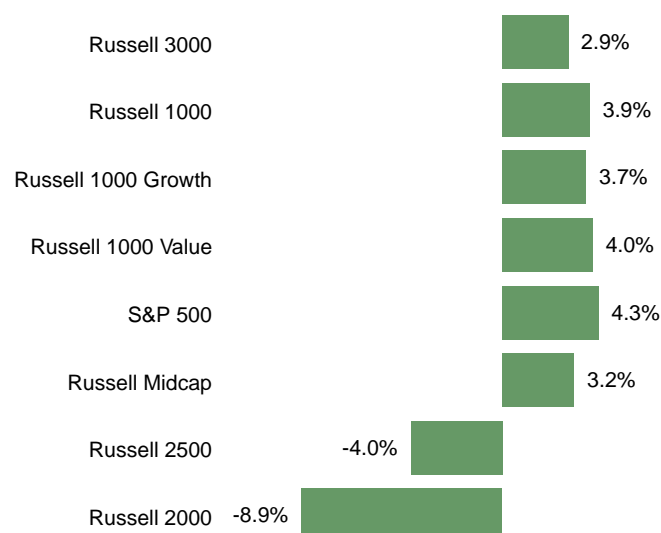
Growth vs. Value (Russell 1000 Value: +1.4%, Russell 1000 Growth: +1.5%; Russell 2000 Value: -0.6%, Russell 2000 Growth: -4.2%)

- While value continues to trail growth year-to-date, it gained ground during September's factor reversal, finishing the quarter essentially in line with growth within large caps.
- Within small cap, value benefited as investors favored the cheapest 20% of small caps while the most expensive quintile within the Russell 2000 declined double digits.

U.S. Equity: Quarterly Returns

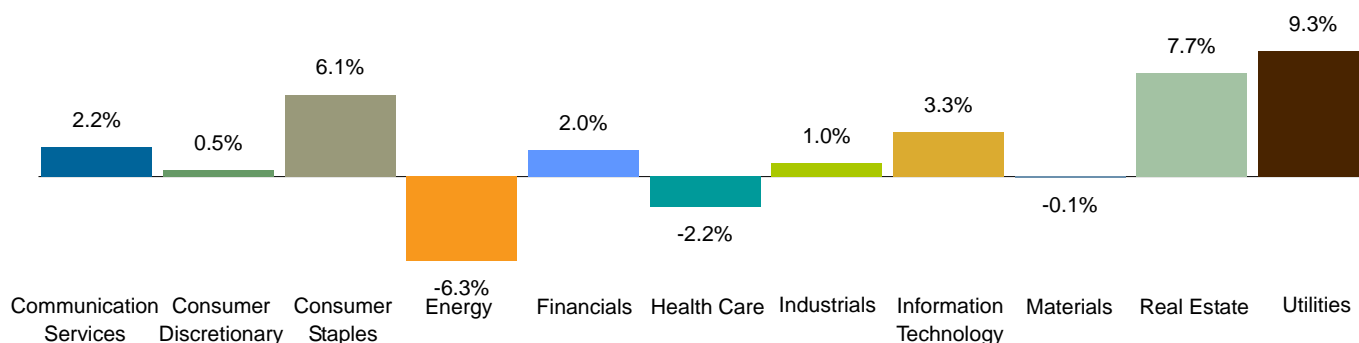


U.S. Equity: One-Year Returns



Sources: FTSE Russell, Standard & Poor's

S&P Sector Returns, Quarter Ended September 30, 2019



Source: Standard & Poor's

NON-U.S./GLOBAL EQUITY

Global equity markets turned negative in the third quarter. After more modest positive results in the second quarter, fears over continued trade war impacts, a no-deal Brexit, and a potential global slowdown impacted investor behavior. Given this backdrop, more defensive areas of the market outperformed.

Global/Non-U.S. Developed (MSCI EAFE: -1.1%; MSCI World ex USA: -0.9%; MSCI ACWI ex USA: -1.8%; MSCI Hong Kong: -11.9%; MSCI Japan: +3.1%)

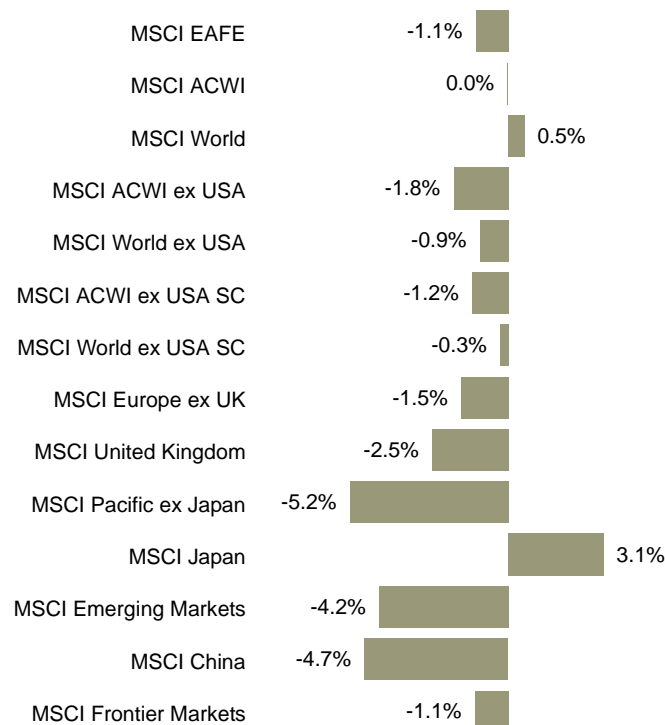
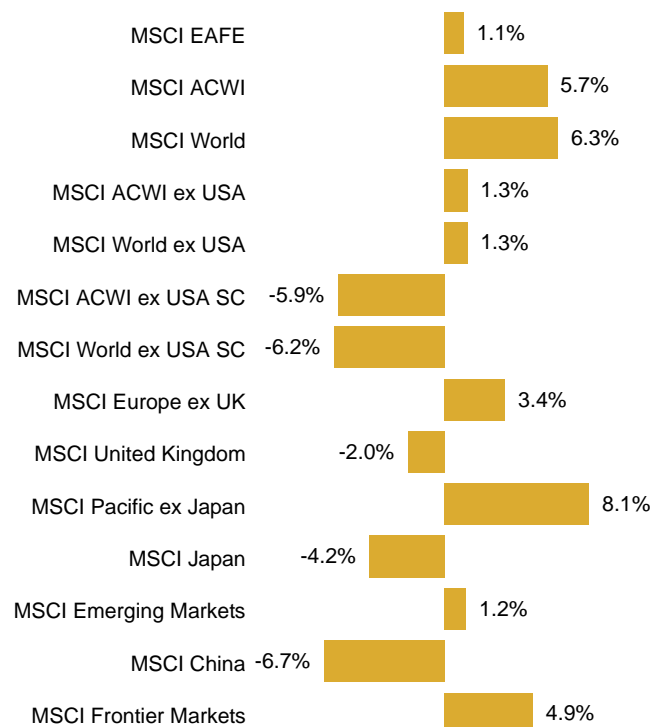
- Boris Johnson's attempted suspension of Parliament and no-deal Brexit proclamations weighed on U.K. stocks (-2.5%).
- Germany (-4.0%) experienced recession fears; industrial production dropped 1.5% in June from the prior month, while the estimate was -0.5%.
- Hong Kong protests proved to be a headwind as the market fell -11.9% over the three-month period.
- Japan was one of the few bright spots within developed markets as low short-term interest rates remain unchanged and a resolution to the Japan/South Korea trade war looked more promising.
- Cyclical sectors trailed as investors were positioned defensively; Energy (-6.5%) had the worst performance.
- For the quarter, factor performance reflected cautious investor behavior as quality and low volatility did well. However, the month of September saw a brief recovery in value across all markets as trade talks improved and central banks eased.

Emerging Markets (MSCI Emerging Markets Index: -4.2%)

- Emerging markets fared worst among global markets; uncertainty weighed heavily on these volatile countries.
- Though most emerging market countries fell during the quarter, Turkey (+11.7%) had strong results as its central bank cut rates two times in less than two months.
- Factor performance in emerging markets favored quality and price momentum as investors moved toward safe assets.

Non-U.S. Small Cap (MSCI World ex USA Small Cap: -0.3%; MSCI EM Small Cap: -4.6%; MSCI ACWI ex USA Small Cap: -1.2%)

- Small cap marginally outperformed large cap, both in developed and all country ex-U.S. markets; despite overall defensive posturing, idiosyncratic businesses pushed past global market issues.
- Japan (+4.0%) helped drive developed returns as small cap companies also benefited from low rates and resolved trade tensions; Hong Kong (-7.6%) detracted as local businesses were hurt by the protests.

Global Equity: Quarterly Returns**Global Equity: One-Year Returns**

Source: MSCI

FIXED INCOME

The Federal Open Market Committee (FOMC) cut short-term interest rates by 25 basis points twice in the third quarter amid an economic backdrop that has been supported by strong consumer spending and a solid labor market, but challenged by weakening manufacturing data and business investment. The Fed chair stated that the FOMC would act as “appropriate to sustain the expansion,” and the European Central Bank and other central banks around the world also moved in the direction of easing monetary policy. Yields fell in the U.S. and abroad given global growth headwinds fueled by mounting trade tensions as well as geopolitical uncertainty.

U.S. Fixed Income (Bloomberg Barclays US Aggregate Bond Index: +2.3%)

- Treasuries returned 2.4% as rates fell across the yield curve.
- While the widely monitored 2- and 10-year key rates remained positive, the spread between the 3-month and 10-year key rates remained inverted.
- Long Treasuries soared (+7.9%) as 30-year yields fell roughly 40 bps.
- Nominal Treasuries outperformed TIPS as inflation expectations continued to fall; 10-year breakeven spreads were 1.53% as of quarter-end, down from 1.69% as of June 30. The 10-year real yield dipped briefly into negative territory in early September.

Investment Grade Corporates (Bloomberg Barclays Corporate: +3.1%)

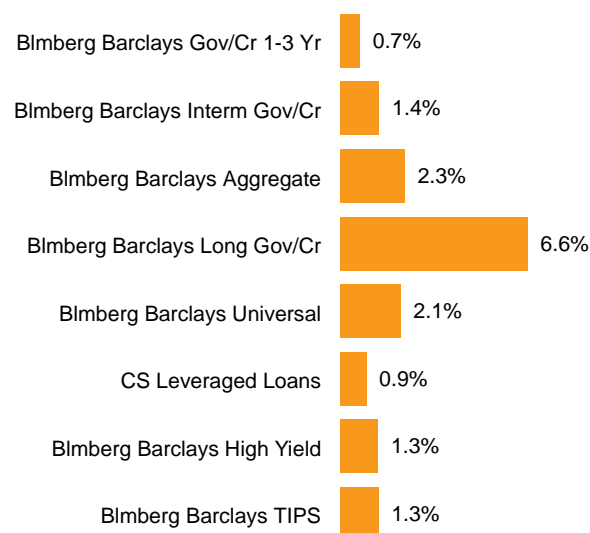
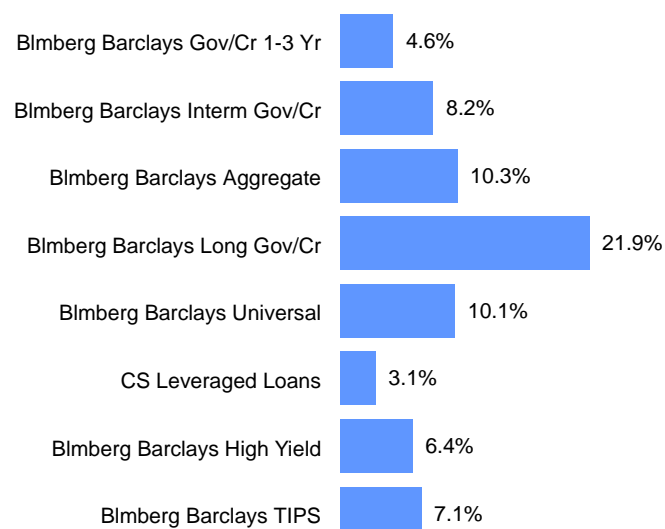
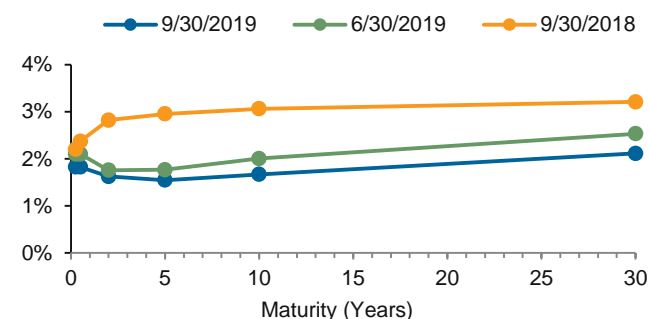
- Investment grade corporate credit spreads were range-bound, but their yield advantage was enough to generate positive excess returns versus like-duration Treasuries.
- Issuance in the corporate bond market was \$320 billion in the quarter, \$50 billion higher than a year ago; demand remained solid. BBB-rated corporates (+3.1%) modestly outperformed A-rated or higher corporates (+3.0%).

High Yield (Bloomberg Barclays Corporate High Yield: +1.3%)

- BB-rated corporates (+2.0%) outperformed CCC-rated corporates (-1.8%). BB- and B-rated spreads narrowed slightly, but the rally in rates helped drive outperformance as a result of higher quality bonds' greater sensitivity to interest rate movements.
- CCC-rated bond spreads widened significantly, representing some concern about deteriorating quality at the lower-end of the spectrum.

Leveraged Loans (CS Leveraged Loans: +0.9%)

- Bank loans, which have floating rate coupons, underperformed high yield bonds as rates rallied and investors worried about deteriorating credit quality.
- CLO issuance continued to exceed expectations, providing positive technical support to the leveraged loan market.

U.S. Fixed Income: Quarterly Returns**U.S. Fixed Income: One-Year Returns****U.S. Treasury Yield Curves**

Sources: Bloomberg, Bloomberg Barclays, Credit Suisse

NON-U.S. FIXED INCOME

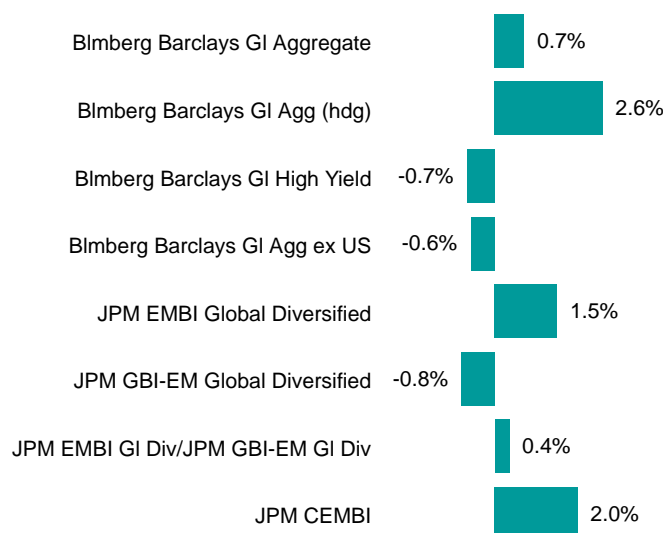
Global Fixed Income (Bloomberg Barclays Global Aggregate (unhedged): +0.7%; (hedged): +2.6%)

- Developed market sovereign bond yields rallied, pushing European sovereigns further into negative territory as the ECB reduced its deposit rate and announced a new bond purchasing stimulus program.
- Negative yielding debt totals nearly \$17 trillion, a record high.
- The U.S. dollar was up 3.4% versus a basket of trade partner currencies and up 4.3% vs the beleaguered euro.

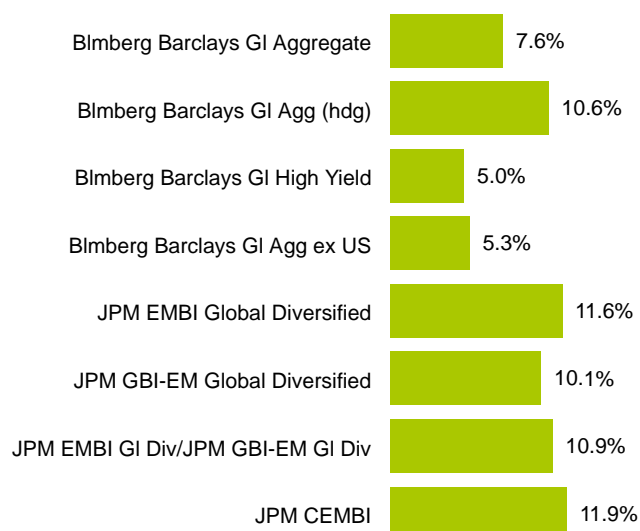
US\$ EMD (JPM EMBI Global Diversified: +1.5%), **Local Currency EMD** (JPM GBI-EM Global Diversified: -0.8%)

- Broadly, emerging market currencies depreciated versus the U.S. dollar, hampering local currency returns.
- Within the dollar-denominated benchmark, Argentina (-42%) and Venezuela (-51%) were among the few to post negative returns. Conversely, returns in the local debt benchmark were more mixed with Turkey (+19%) and Argentina (-60%) being outliers.

Global Fixed Income: Quarterly Returns

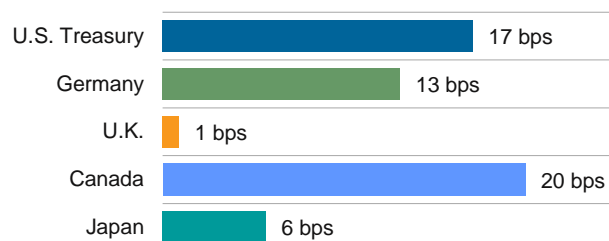


Global Fixed Income: One-Year Returns



Change in 10-Year Global Government Bond Yields

2Q19 to 3Q19



Sources: Bloomberg, Bloomberg Barclays, JP Morgan

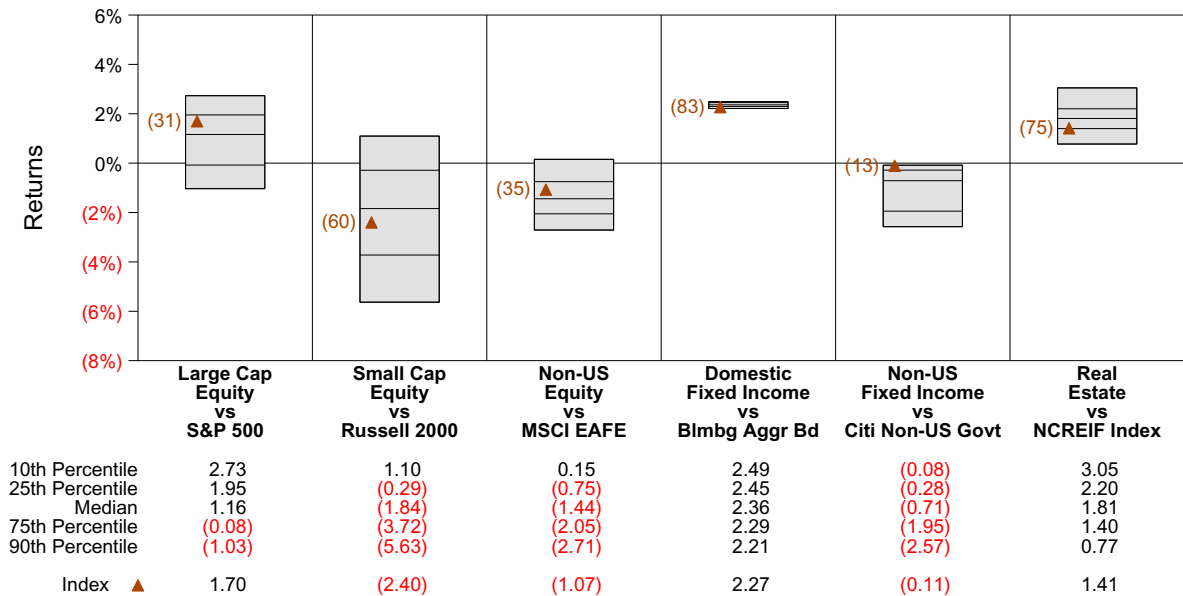
Market Overview

Active Management vs Index Returns

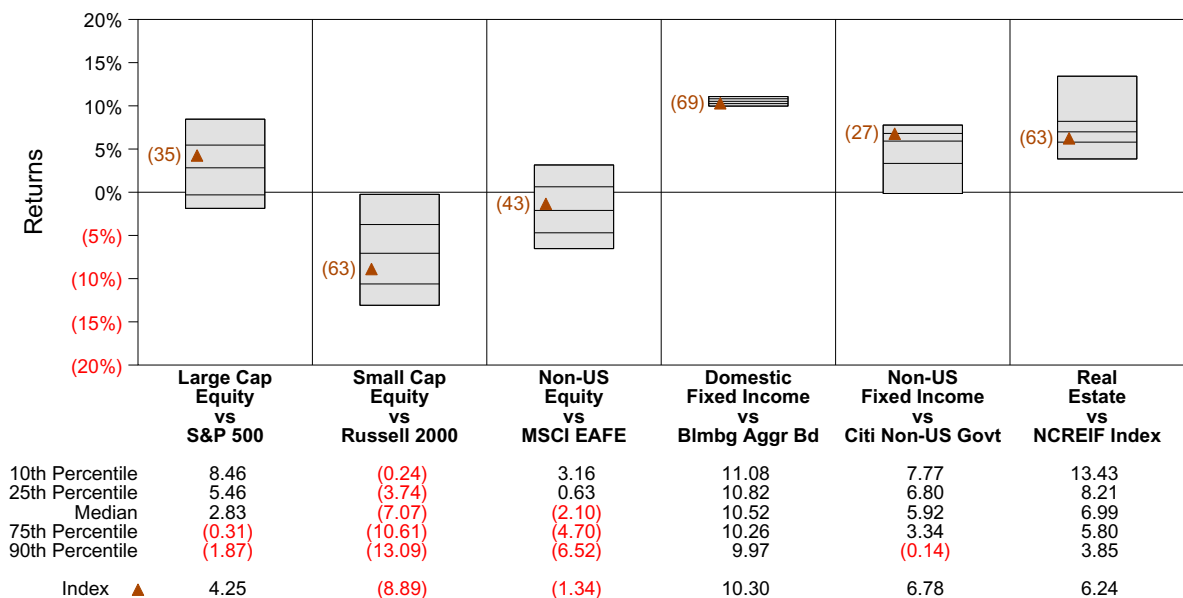
Market Overview

The charts below illustrate the range of returns across managers in Callan's Separate Account database over the most recent one quarter and one year time periods. The database is broken down by asset class to illustrate the difference in returns across those asset classes. An appropriate index is also shown for each asset class for comparison purposes. As an example, the first bar in the upper chart illustrates the range of returns for domestic equity managers over the last quarter. The triangle represents the S&P 500 return. The number next to the triangle represents the ranking of the S&P 500 in the Large Cap Equity manager database.

Range of Separate Account Manager Returns by Asset Class One Quarter Ended September 30, 2019



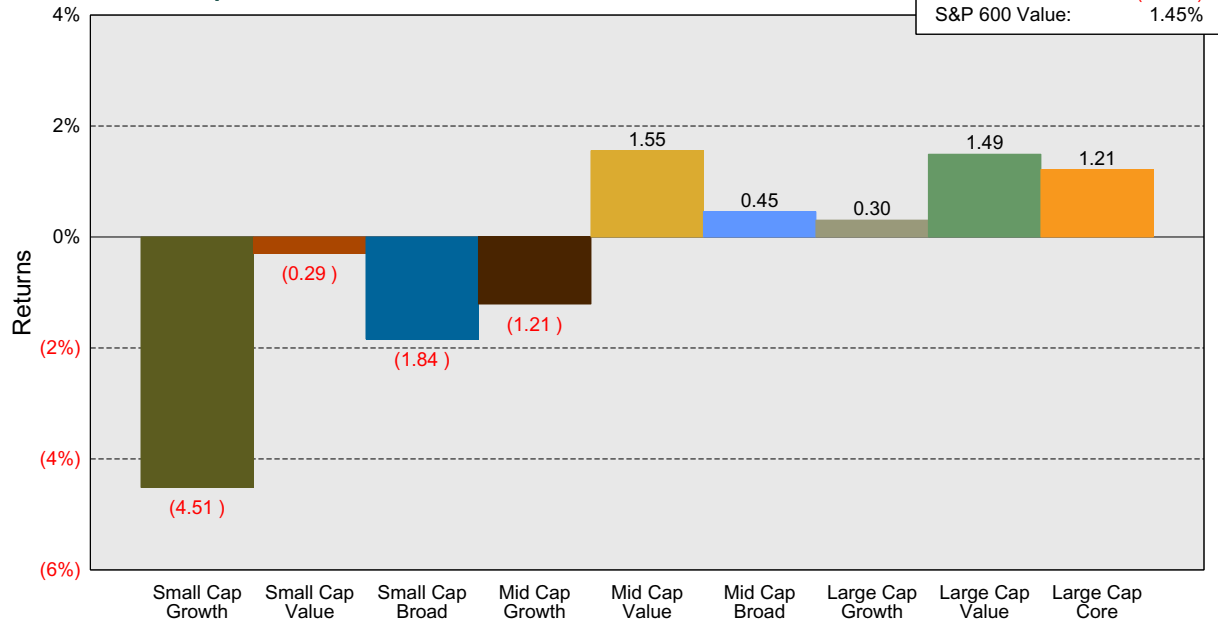
Range of Separate Account Manager Returns by Asset Class One Year Ended September 30, 2019



Domestic Equity Active Management Overview

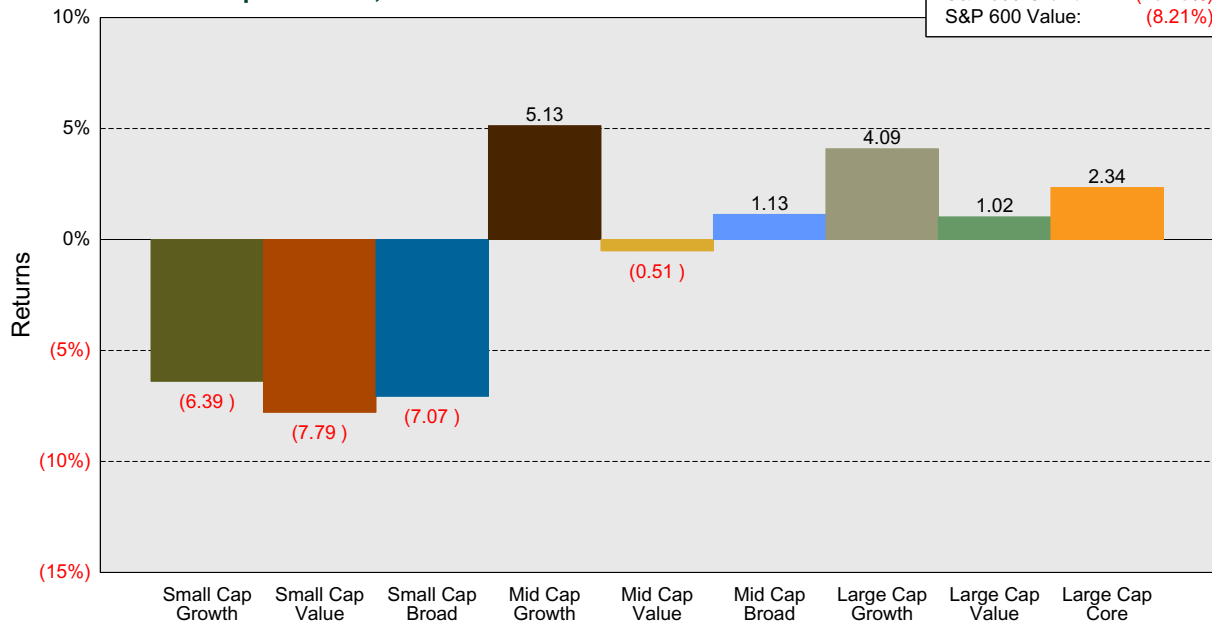
The S&P 500 Index returned 1.7% in the third quarter, bringing its YTD result to an impressive 20.6%. Third quarter returns were mixed across sectors. The winners were Real Estate (+7.7%) and Utilities (+9.3%), both benefiting from lower interest rates. Returns for both sectors are approaching 30% on a YTD basis. Energy, hurt by falling oil prices, lost 6.3% and is up only 6.0% for the year. Health Care was another poor performer, down 2.2% and up 5.6% YTD. From a style perspective, value mounted a comeback late in the quarter, but over the full quarter returns across styles were similar (R1000: 1.4%; R1000G: 1.5%; R1000V: 1.4%). Small caps underperformed (R2000: -2.4% vs R1000: +1.4%) and, notably, small cap value outperformed small cap growth by a significant margin (R2000V: -0.6% vs R2000G: -4.2%).

Separate Account Style Group Median Returns for Quarter Ended September 30, 2019



S&P 500:	1.70%
S&P 500 Growth:	0.72%
S&P 500 Value:	2.83%
S&P Mid Cap:	(0.09%)
S&P 600:	(0.20%)
S&P 600 Growth:	(1.86%)
S&P 600 Value:	1.45%

Separate Account Style Group Median Returns for One Year Ended September 30, 2019

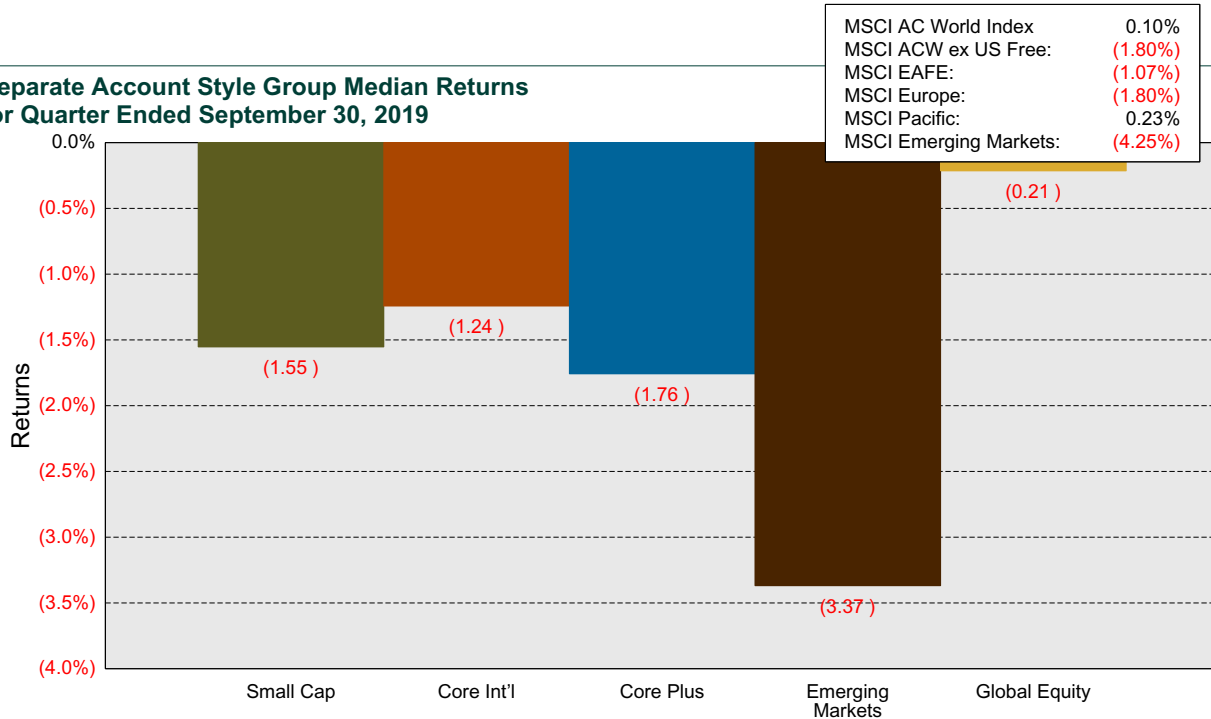


S&P 500:	4.25%
S&P 500 Growth:	3.25%
S&P 500 Value:	5.56%
S&P Mid Cap:	(2.49%)
S&P 600:	(9.34%)
S&P 600 Growth:	(10.40%)
S&P 600 Value:	(8.21%)

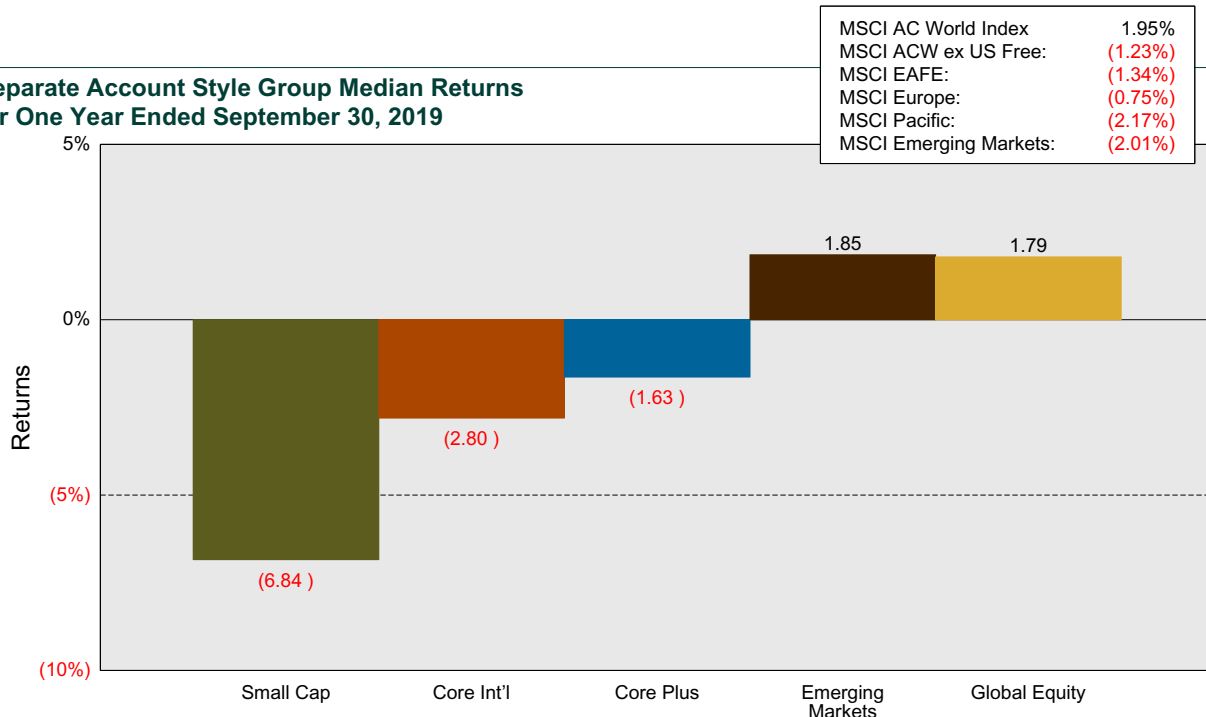
International Equity Active Management Overview

International markets lagged the U.S. on the back of broad-based strength in the U.S. dollar. The MSCI ACWI ex USA Index fell 1.8%, with emerging markets (MSCI EM: -4.2%) underperforming developed (MSCI EAFE: -1.1%). The U.K. sank 2.5% due solely to performance of its currency, which lost just over 3% versus the U.S. dollar on Brexit-related woes. Japan (+3.1%) was one of the few countries to post a positive return, and the yen was also essentially flat vs the U.S. dollar. Brazil, India, and China were off roughly 5%, and Russia posted a more modest 1.4% loss. Political uncertainty in Argentina caused its market to lose half its value in August (-47%); that said, Argentina just entered the EM Index in May 2019 and accounts for a very small slice (less than 1%). Value underperformed growth in both developed and emerging markets and remains far behind on a YTD basis. From a sector standpoint, Technology (MSCI ACWI ex USA Technology: +2.2%) was up the most while Materials (-6.5%) and Energy (-4.6%) performed the worst.

**Separate Account Style Group Median Returns
for Quarter Ended September 30, 2019**



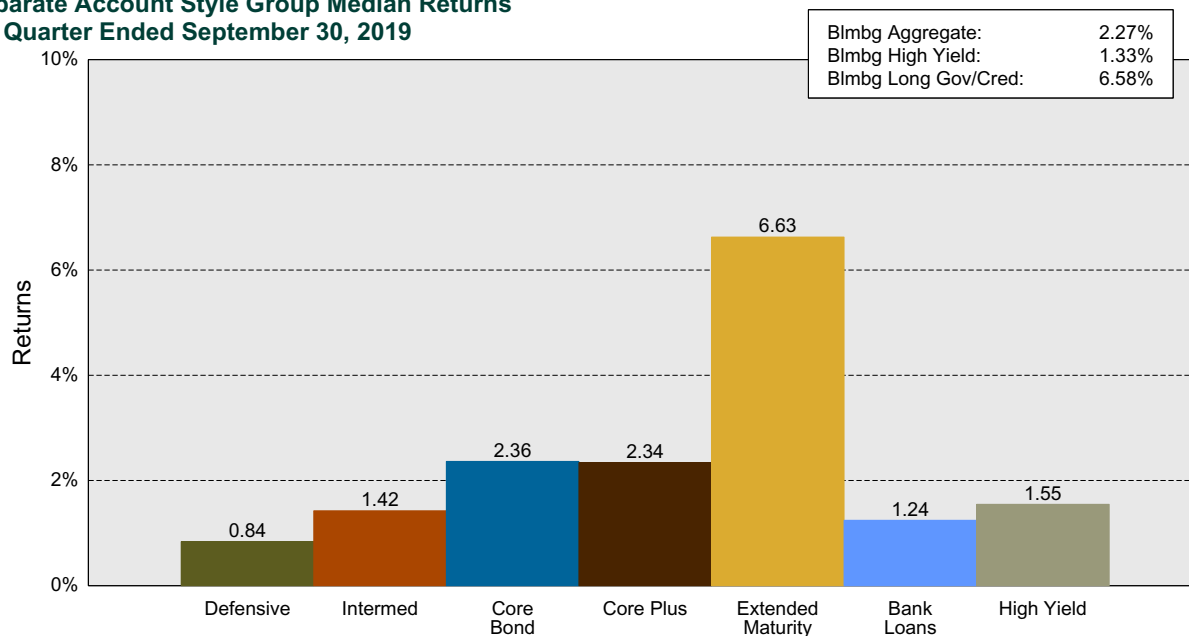
**Separate Account Style Group Median Returns
for One Year Ended September 30, 2019**



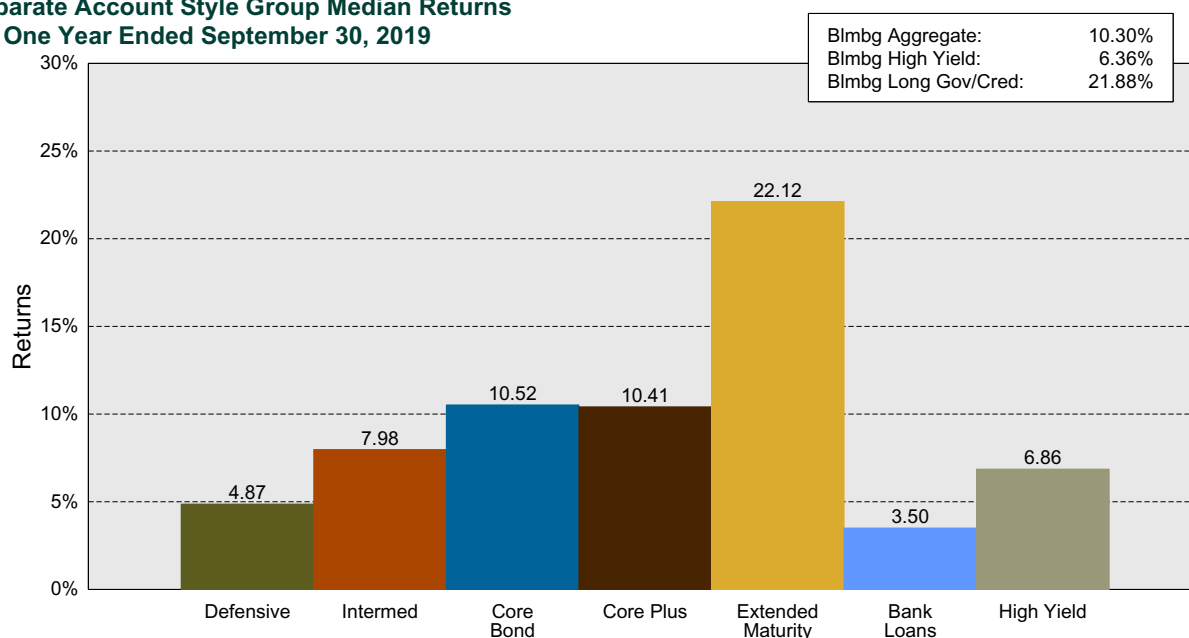
Domestic Fixed Income Active Management Overview

Ten-year U.S. Treasury yields were volatile in the third quarter, especially in September, hitting a 2019 low of 1.40% on Sept. 4, soaring to 1.90% mid-month and closing the quarter at 1.68%, down 32 bps from June 30. U.S. Treasuries thus posted strong results (Bloomberg Barclays US Treasury Index: +2.4%). Long U.S. Treasuries soared (Bloomberg Barclays Long US Treasury Index: +7.9%; +19.8% YTD) in the falling rate environment. The Bloomberg Barclays Aggregate rose 2.3%, bringing its YTD result to an impressive +8.5%. High yield was up just over 1% (+11.4% YTD) but, notably, lower quality significantly underperformed (CCC: -1.8% vs BB: +2.0%, and +5.6% vs +12.8% YTD) representing some concern about deteriorating quality at the lower end of the spectrum. TIPS (Bloomberg Barclays TIPS: +1.3%) underperformed as inflation expectations waned; 10-year breakeven spreads were 1.53% as of quarter-end, down from 1.69% as of 6/30/19. The 10-year real yield dipped briefly into negative territory in early September.

Separate Account Style Group Median Returns for Quarter Ended September 30, 2019



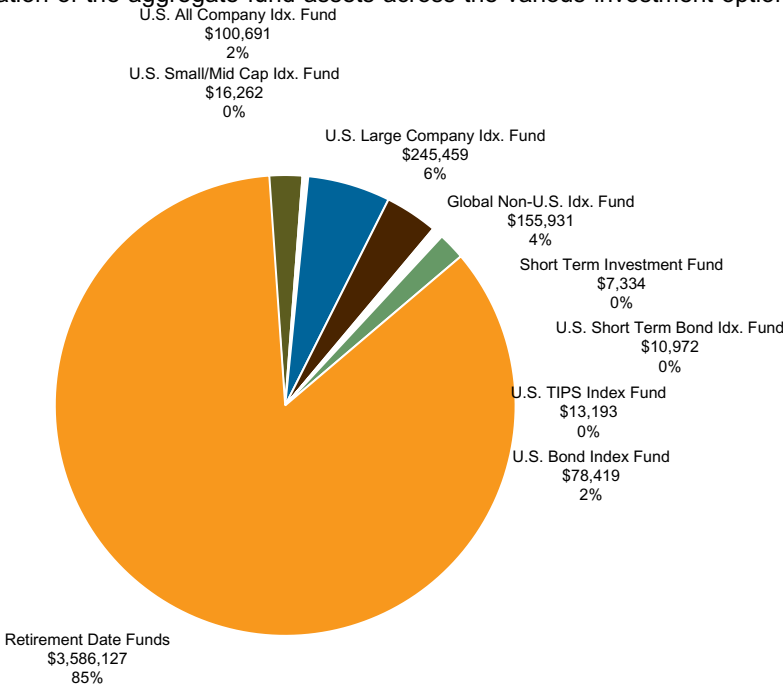
Separate Account Style Group Median Returns for One Year Ended September 30, 2019



Changes in Investment Fund Balances Period Ended September 30, 2019

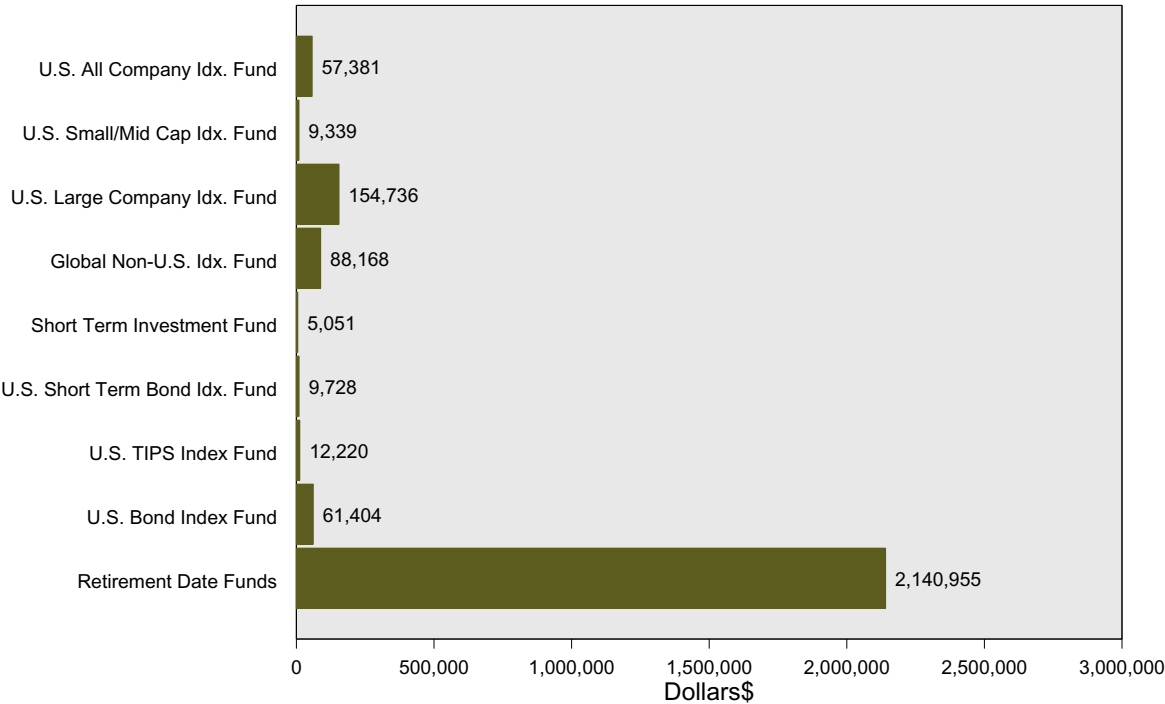
Allocation Across Investment Options

The chart below illustrates the allocation of the aggregate fund assets across the various investment options for the quarter ended September 30, 2019.



Changes in Fund Values

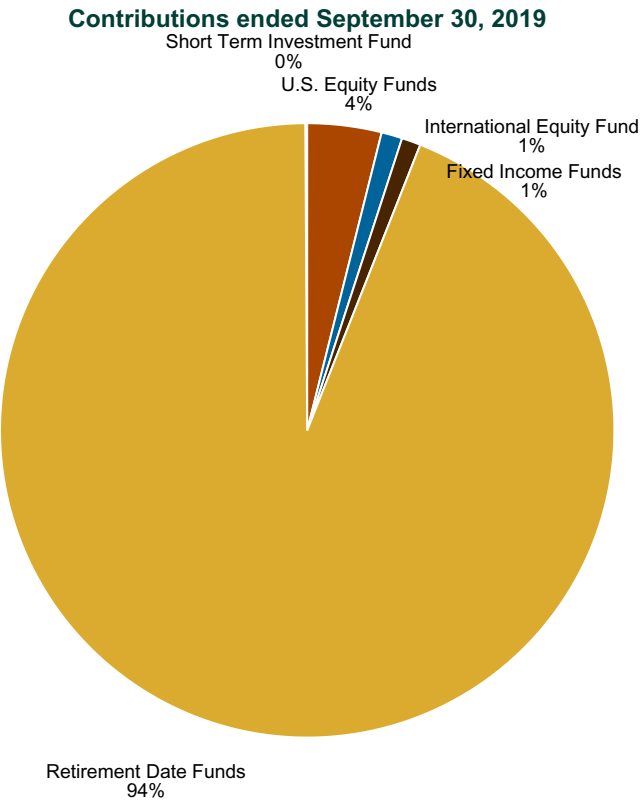
The chart below shows the net change in fund values across the various investment options for the quarter ended September 30, 2019. The change in value for each fund is the result of a combination of 3 factors: 1) market movements; 2) contributions or disbursements into or out of the funds by the participants (and any matching done by the company); and 3) transfers between funds by the participants.



Pennsylvania SERS 401(a)
Summary of Contributions

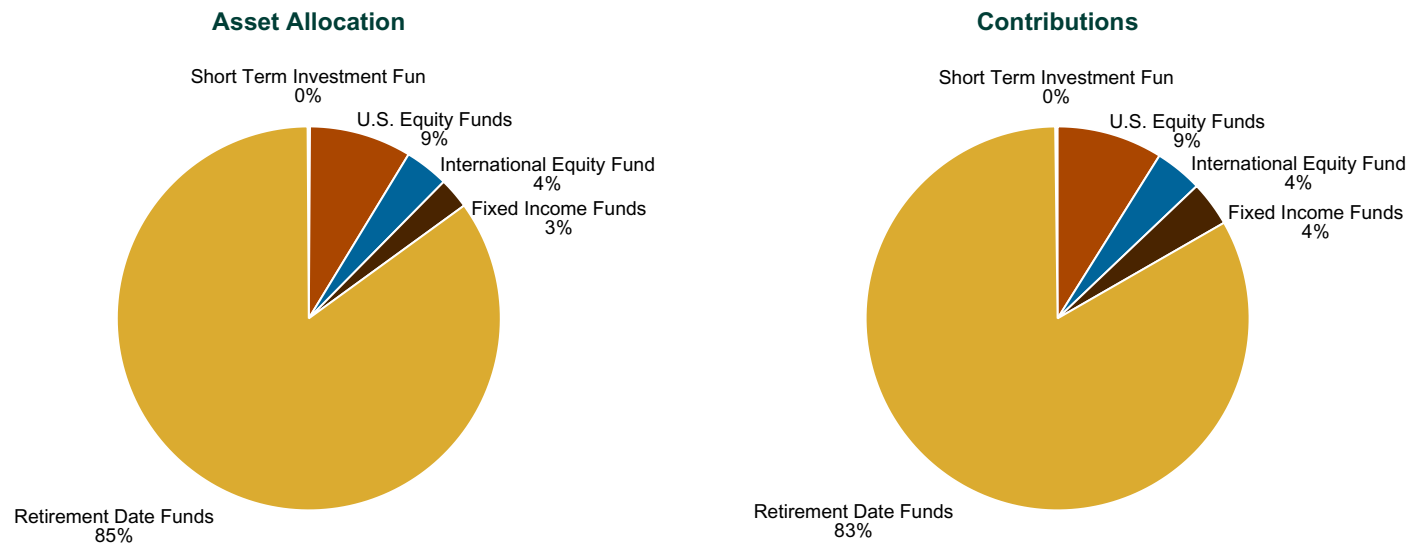
Contributions

The chart below illustrates the contributions for the fund for the past quarter.

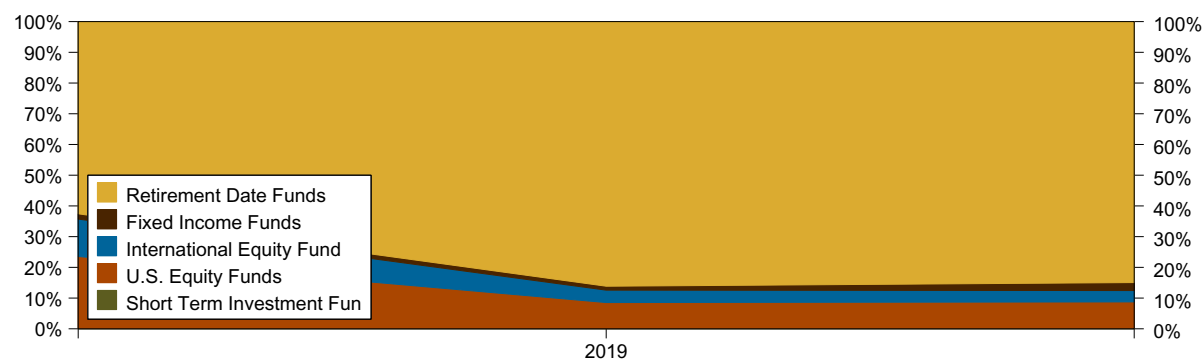


Asset Allocation

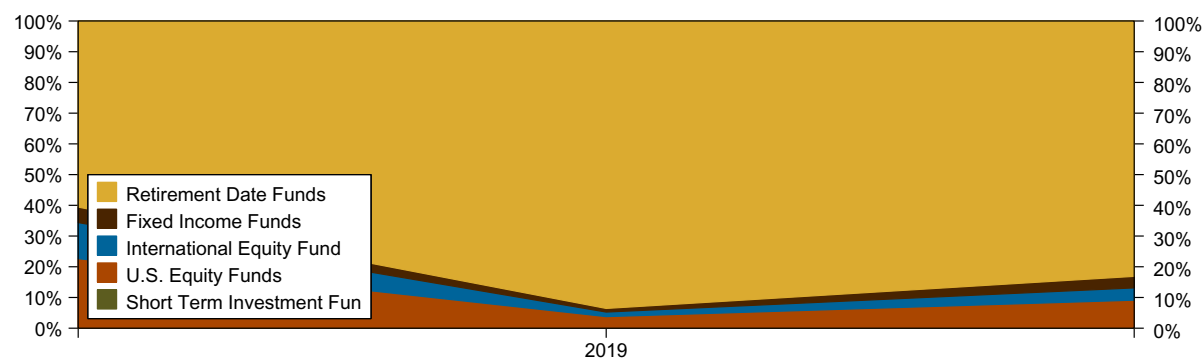
The charts below illustrate the historical asset allocation of the fund as well as the historical allocations of contributions to the fund. The pie charts on the top show the most recent allocations of both assets and contributions which include exchanges and transfers within the plan. The middle chart displays the historical allocation of fund assets. The bottom chart illustrates the historical allocation of contributions.



Historical Asset Allocation



Historical Allocation of Contributions



Investment Manager Asset Allocation

The table below contrasts the distribution of assets across the Fund's investment managers as of September 30, 2019, with the distribution as of June 30, 2019. The change in asset distribution is broken down into the dollar change due to Net New Investment and the dollar change due to Investment Return.

Asset Distribution Across Investment Managers

	September 30, 2019				June 30, 2019	
	Market Value	% of Total	Net New Inv.	Inv. Return	Market Value	% of Total
SERS Retirement Date Funds	\$3,586,127	85.09%	\$2,115,676	\$25,279	\$1,445,172	86.26%
SERS Post Retirement Fund	31,683	0.75%	20,333	289	11,061	0.66%
SERS 2020 Retirement Fund	44,115	1.05%	26,863	412	16,841	1.01%
SERS 2025 Retirement Fund	216,221	5.13%	105,675	1,987	108,559	6.48%
SERS 2030 Retirement Fund	291,592	6.92%	176,231	2,432	112,929	6.74%
SERS 2035 Retirement Fund	322,680	7.66%	195,252	2,393	125,035	7.46%
SERS 2040 Retirement Fund	383,227	9.09%	237,583	2,363	143,281	8.55%
SERS 2045 Retirement Fund	522,157	12.39%	260,998	4,020	257,140	15.35%
SERS 2050 Retirement Fund	491,254	11.66%	298,435	3,418	189,401	11.30%
SERS 2055 Retirement Fund	494,314	11.73%	303,491	3,173	187,650	11.20%
SERS 2060 Retirement Fund	788,882	18.72%	490,814	4,792	293,276	17.50%
SERS U.S. Equity	\$362,412	8.60%	\$215,854	\$5,600	\$140,958	8.41%
SERS U.S. Large Company Idx Fund	245,459	5.82%	150,142	4,593	90,723	5.41%
SERS U.S. All Company Idx Fund	100,691	2.39%	56,201	1,180	43,311	2.59%
SERS U.S. SMID Company Idx Fund	16,262	0.39%	9,511	(172)	6,924	0.41%
International Equity						
SERS Global Non-U.S. Index Fund	155,931	3.70%	87,515	653	67,763	4.04%
SERS Fixed Income	\$109,918	2.61%	\$87,506	\$897	\$21,515	1.28%
SERS Short Term Investment Fund	7,334	0.17%	5,024	27	2,283	0.14%
SERS U.S. Short Term Bond Idx Fund	10,972	0.26%	9,686	42	1,244	0.07%
SERS U.S. TIPS Index Fund	13,193	0.31%	12,227	(7)	973	0.06%
SERS U.S. Bond Index Fund	78,419	1.86%	60,568	836	17,014	1.02%
Total Fund	\$4,214,389	100.0%	\$2,506,551	\$32,430	\$1,675,407	100.0%

Investment Fund Returns

The table below details the rates of return for the Fund's investment funds over various time periods ended September 30, 2019. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized.

Returns for Periods Ended September 30, 2019

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 7 Years
Net Performance					
Target Date Funds					
SERS Post Retirement Fund	1.40%	6.38%	5.59%	4.76%	5.01%
BlackRock Post Retirement Index	1.40%	6.43%	5.58%	4.75%	4.99%
Callan Tgt Date 2000-2010	1.08%	5.60%	5.46%	4.71%	5.46%
SERS 2020 Retirement Fund	1.34%	5.97%	6.16%	5.14%	5.86%
BlackRock 2020 Index	1.35%	6.02%	6.14%	5.10%	5.81%
Callan Target Date 2020	1.06%	5.11%	6.32%	5.26%	6.46%
SERS 2025 Retirement Fund	1.12%	5.34%	6.96%	5.64%	6.55%
BlackRock 2025 Index	1.12%	5.32%	6.90%	5.58%	6.49%
Callan Target Date 2025	0.99%	4.56%	7.04%	5.70%	7.22%
SERS 2030 Retirement Fund	0.91%	4.71%	7.66%	6.08%	7.15%
BlackRock 2030 Index	0.90%	4.68%	7.56%	5.98%	7.06%
Callan Target Date 2030	0.80%	3.95%	7.83%	6.21%	7.85%
SERS 2035 Retirement Fund	0.71%	4.12%	8.32%	6.48%	7.71%
BlackRock 2035 Index	0.70%	4.05%	8.19%	6.36%	7.59%
Callan Target Date 2035	0.62%	3.23%	8.32%	6.57%	8.25%
SERS 2040 Retirement Fund	0.53%	3.55%	8.87%	6.81%	8.17%
BlackRock 2040 Index	0.54%	3.50%	8.73%	6.67%	8.05%
Callan Target Date 2040	0.43%	2.53%	8.71%	6.72%	8.66%
SERS 2045 Retirement Fund	0.40%	3.11%	9.19%	7.00%	8.54%
BlackRock 2045 Index	0.39%	2.99%	9.00%	6.84%	8.40%
Callan Target Date 2045	0.30%	2.11%	8.97%	6.91%	8.82%
SERS 2050 Retirement Fund	0.34%	2.94%	9.29%	7.07%	8.78%
BlackRock 2050 Index	0.34%	2.80%	9.10%	6.90%	8.64%
Callan Target Date 2050	0.28%	1.99%	9.06%	6.96%	8.95%
SERS 2055 Retirement Fund	0.34%	2.94%	9.28%	7.07%	8.95%
BlackRock 2055 Index	0.34%	2.81%	9.10%	6.91%	8.82%
Callan Target Date 2055	0.25%	1.94%	9.12%	7.05%	8.91%
SERS 2060 Retirement Fund	0.33%	2.91%	9.26%	-	-
BlackRock 2060 Index	0.34%	2.81%	9.10%	-	-
Callan Target Date 2060	0.28%	1.98%	9.24%	7.19%	9.42%

Investment Fund Returns

The table below details the rates of return for the Fund's investment funds over various time periods ended September 30, 2019. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized.

Returns for Periods Ended September 30, 2019			
	Last 10 Years	Last 15 Years	Last 20 Years
Net Performance			
Target Date Funds			
SERS Post Retirement Fund	5.99%	-	-
BlackRock Post Retirement Index	5.99%	5.50%	5.59%
Callan Tgt Date 2000-2010	6.29%	4.92%	-
SERS 2020 Retirement Fund	6.79%	-	-
BlackRock 2020 Index	6.78%	5.89%	5.10%
Callan Target Date 2020	7.37%	5.56%	4.71%
SERS 2025 Retirement Fund	7.37%	-	-
BlackRock 2025 Index	7.33%	6.17%	5.16%
Callan Target Date 2025	8.05%	6.49%	-
SERS 2030 Retirement Fund	7.86%	-	-
BlackRock 2030 Index	7.80%	6.41%	5.18%
Callan Target Date 2030	8.50%	6.06%	4.84%
SERS 2035 Retirement Fund	8.32%	-	-
BlackRock 2035 Index	8.23%	6.61%	5.19%
Callan Target Date 2035	8.89%	6.94%	-
SERS 2040 Retirement Fund	8.69%	-	-
BlackRock 2040 Index	8.60%	6.77%	5.16%
Callan Target Date 2040	9.09%	6.42%	4.35%
SERS 2045 Retirement Fund	8.98%	-	-
BlackRock 2045 Index	8.88%	6.89%	5.12%
Callan Target Date 2045	9.10%	7.48%	-
SERS 2050 Retirement Fund	9.20%	-	-
BlackRock 2050 Index	9.10%	7.17%	6.27%
Callan Target Date 2050	9.21%	-	-

(1) Funds not listed do not have longer term history.

Investment Fund Returns

The table below details the rates of return for the Fund's investment funds over various time periods ended September 30, 2019. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized.

Returns for Periods Ended September 30, 2019

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 7 Years
Net Performance					
Domestic Equity					
SERS U.S. Large Company Index Fund	1.69%	4.26%	13.39%	10.84%	13.26%
S&P 500 Index	1.70%	4.25%	13.39%	10.84%	13.26%
Callan Lg Cap Broad MF	0.76%	2.27%	12.67%	9.74%	12.54%
SERS U.S. All Company Index Fund	0.78%	2.52%	12.64%	10.34%	12.91%
Russell 3000 Index	1.16%	2.92%	12.83%	10.44%	13.00%
Callan Multi Cap Brd MF	0.50%	0.96%	11.08%	8.64%	11.79%
SERS U.S. SMID Company Idx Fund	(1.52%)	(3.63%)	10.07%	8.56%	11.71%
Dow Jones US Completion	(1.64%)	(3.95%)	9.84%	8.36%	11.50%
Callan SMID Broad MFs	(1.77%)	(4.42%)	10.81%	8.51%	10.97%
International Equity					
SERS Global Non-U.S. Index Fund	(1.77%)	(0.89%)	6.53%	3.14%	5.20%
MSCI ACWI ex US	(1.80%)	(1.23%)	6.33%	2.90%	5.01%
Callan Non US Equity MFs	(1.29%)	(2.22%)	5.94%	3.16%	5.85%
Domestic Fixed Income					
SERS Short Term Investment Fund	0.59%	2.43%	1.73%	1.16%	0.88%
3-month Treasury Bill	0.56%	2.39%	1.54%	0.98%	0.72%
Callan Cash Database(1)	0.64%	2.79%	1.89%	1.41%	1.16%
SERS U.S. Short Term Bond Idx Fund	0.68%	4.60%	-	-	-
Blmbg Gov/Cred 1-3 Yr	0.69%	4.64%	1.82%	1.59%	1.33%
Callan Short US Govt MFs	0.64%	4.19%	1.33%	1.31%	0.95%
SERS U.S. TIPS Index Fund	1.31%	7.08%	-	-	-
Blmbg US TIPS	1.35%	7.13%	2.21%	2.45%	1.06%
Callan TIPS MFs	1.10%	6.16%	2.14%	1.99%	0.84%
SERS U.S. Bond Index Fund	2.24%	10.27%	2.88%	3.32%	2.65%
Blmbg Aggregate	2.27%	10.30%	2.92%	3.38%	2.72%
Callan Core Bond MFs	2.25%	10.14%	3.12%	3.36%	2.73%

(1) Callan Cash Database includes STIF, enhanced cash, and money market funds.

Investment Fund Returns

The table below details the rates of return for the Fund's investment funds over various time periods ended September 30, 2019. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized.

Returns for Periods Ended September 30, 2019			
	Last 10 Years	Last 15 Years	Last 20 Years
Net Performance			
Domestic Equity			
SERS U.S. Large Company Index Fund	13.25%	9.04%	6.38%
S&P 500 Index	13.24%	9.01%	6.33%
Callan Lg Cap Broad MF	12.43%	8.83%	6.37%
Russell 3000 Index	13.08%	9.10%	6.72%
Callan Multi Cap Brd MF	11.69%	8.43%	7.12%
SERS U.S. SMID Company Idx Fund	12.51%	9.64%	8.38%
Dow Jones US Completion	12.31%	9.45%	8.06%
Callan SMID Broad MFs	12.13%	9.31%	8.88%
International Equity			
SERS Global Non-U.S. Index Fund	4.60%	-	-
MSCI ACWI ex US	4.46%	5.66%	-
Callan Non US Equity MFs	5.18%	5.65%	4.48%
Domestic Fixed Income			
SERS Short Term Investment Fund	0.69%	1.56%	-
3-month Treasury Bill	0.54%	1.39%	1.82%
Callan Cash Database(1)	1.02%	1.87%	2.36%
Blmbg Gov/Cred 1-3 Yr	1.52%	2.43%	3.19%
Callan Short US Govt MFs	1.34%	2.31%	3.13%
Blmbg US TIPS	3.46%	3.90%	5.47%
Callan TIPS MFs	3.17%	3.63%	4.67%
SERS U.S. Bond Index Fund	3.67%	4.14%	4.96%
Blmbg Aggregate	3.75%	4.21%	5.01%
Callan Core Bond MFs	4.01%	4.46%	5.07%

(1) Callan Cash Database includes STIF, enhanced cash, and money market funds.

(2) Funds not listed do not have longer term history.

Investment Fund Returns

The table below details the rates of return for the Fund's investment funds over various time periods. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized.

	12/2018- 9/2019	2018	2017	2016	2015
Net Performance					
Target Date Funds					
SERS Post Retirement Fund	11.64%	(3.49%)	10.17%	6.09%	(1.14%)
BlackRock Post Retirement Index	11.64%	(3.48%)	10.10%	6.01%	(1.07%)
Callan Tgt Date 2000-2010	10.68%	(3.15%)	10.16%	5.79%	(0.48%)
SERS 2020 Retirement Fund	11.97%	(3.89%)	11.77%	6.64%	(1.27%)
BlackRock 2020 Index	11.96%	(3.88%)	11.67%	6.51%	(1.28%)
Callan Target Date 2020	11.93%	(4.29%)	12.61%	6.51%	(1.03%)
SERS 2025 Retirement Fund	13.13%	(4.88%)	13.90%	7.28%	(1.43%)
BlackRock 2025 Index	13.09%	(4.90%)	13.75%	7.10%	(1.45%)
Callan Target Date 2025	13.07%	(5.19%)	15.03%	7.08%	(1.19%)
SERS 2030 Retirement Fund	14.05%	(5.71%)	15.82%	7.87%	(1.61%)
BlackRock 2030 Index	14.00%	(5.76%)	15.64%	7.61%	(1.66%)
Callan Target Date 2030	13.95%	(6.12%)	16.81%	7.58%	(1.31%)
SERS 2035 Retirement Fund	14.94%	(6.50%)	17.68%	8.41%	(1.80%)
BlackRock 2035 Index	14.84%	(6.58%)	17.48%	8.08%	(1.86%)
Callan Target Date 2035	14.79%	(7.03%)	18.54%	8.20%	(1.46%)
SERS 2040 Retirement Fund	15.71%	(7.24%)	19.35%	8.86%	(2.00%)
BlackRock 2040 Index	15.63%	(7.33%)	19.09%	8.51%	(2.08%)
Callan Target Date 2040	15.30%	(7.89%)	19.84%	8.48%	(1.55%)
SERS 2045 Retirement Fund	16.27%	(7.85%)	20.44%	9.16%	(2.15%)
BlackRock 2045 Index	16.17%	(7.99%)	20.15%	8.77%	(2.22%)
Callan Target Date 2045	15.69%	(8.21%)	20.63%	8.63%	(1.58%)
SERS 2050 Retirement Fund	16.51%	(8.12%)	20.83%	9.24%	(2.20%)
BlackRock 2050 Index	16.41%	(8.26%)	20.55%	8.82%	(2.26%)
Callan Target Date 2050	15.76%	(8.44%)	20.74%	8.61%	(1.56%)
SERS 2055 Retirement Fund	16.55%	(8.15%)	20.81%	9.21%	(2.18%)
BlackRock 2055 Index	16.45%	(8.28%)	20.55%	8.82%	(2.26%)
Callan Target Date 2055	15.83%	(8.44%)	21.12%	8.65%	(1.69%)
SERS 2060 Retirement Fund	16.52%	(8.15%)	20.76%	9.23%	(2.15%)
BlackRock 2060 Index	16.45%	(8.28%)	20.55%	8.82%	(2.16%)
Callan Target Date 2060	15.81%	(8.35%)	21.14%	8.80%	(1.57%)

Investment Fund Returns

The table below details the rates of return for the Fund's investment funds over various time periods. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized.

	12/2018- 9/2019	2018	2017	2016	2015
Net Performance					
Domestic Equity					
SERS U.S. Large Company Index Fund	20.55%	(4.40%)	21.83%	11.97%	1.39%
S&P 500 Index	20.55%	(4.38%)	21.83%	11.96%	1.38%
Callan Lg Cap Broad MF	19.76%	(4.54%)	23.56%	8.43%	1.50%
SERS U.S. All Company Index Fund	19.63%	(5.30%)	21.05%	12.69%	0.45%
Russell 3000 Index	20.09%	(5.24%)	21.13%	12.74%	0.48%
Callan Multi Cap Brd MF	19.21%	(6.82%)	20.75%	9.05%	(1.26%)
SERS U.S. SMID Company Idx Fund	17.76%	(9.34%)	18.18%	16.05%	(3.32%)
Dow Jones US Completion	17.54%	(9.57%)	18.12%	15.75%	(3.42%)
Callan SMID Broad MFs	18.99%	(8.69%)	17.14%	13.80%	(2.80%)
International Equity					
SERS Global Non-U.S. Index Fund	11.95%	(13.91%)	27.57%	5.00%	(5.63%)
MSCI ACWI ex US	11.56%	(14.20%)	27.19%	4.50%	(5.66%)
Callan Non US Equity MFs	13.22%	(15.04%)	26.90%	0.23%	0.02%
Domestic Fixed Income					
SERS Short Term Investment Fund	1.82%	2.09%	1.08%	0.59%	0.19%
3-month Treasury Bill	1.81%	1.87%	0.86%	0.33%	0.05%
Callan Cash Database(1)	2.19%	2.00%	1.19%	0.95%	0.40%
SERS U.S. Short Term Bond Idx Fund	3.39%	1.55%	-	-	-
Blmbg Gov/Cred 1-3 Yr	3.42%	1.60%	0.84%	1.28%	0.65%
Callan Short US Govt MFs	3.21%	1.15%	0.59%	0.64%	0.35%
SERS U.S. TIPS Index Fund	7.52%	(1.27%)	-	-	-
Blmbg US TIPS	7.58%	(1.26%)	3.01%	4.68%	(1.44%)
Callan TIPS MFs	7.40%	(1.53%)	3.12%	4.63%	(1.76%)
SERS U.S. Bond Index Fund	8.48%	0.00%	3.50%	2.56%	0.46%
Blmbg Aggregate	8.52%	0.01%	3.54%	2.65%	0.55%
Callan Core Bond MFs	8.80%	(0.35%)	3.71%	3.03%	0.10%

(1) Callan Cash Database includes STIF, enhanced cash, and money market funds.

Investment Fund Returns

The table below details the rates of return for the Fund's investment funds over various time periods ended September 30, 2019. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized.

Returns for Periods Ended September 30, 2019

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 7 Years
Gross Performance					
Target Date Funds					
SERS Post Retirement Fund	1.42%	6.47%	5.67%	4.84%	5.09%
BlackRock Post Retirement Index	1.40%	6.43%	5.58%	4.75%	4.99%
Callan Tgt Date 2000-2010	1.08%	5.60%	5.46%	4.71%	5.46%
SERS 2020 Retirement Fund	1.36%	6.06%	6.25%	5.22%	5.94%
BlackRock 2020 Index	1.35%	6.02%	6.14%	5.10%	5.81%
Callan Target Date 2020	1.06%	5.11%	6.32%	5.26%	6.46%
SERS 2025 Retirement Fund	1.14%	5.42%	7.05%	5.73%	6.63%
BlackRock 2025 Index	1.12%	5.32%	6.90%	5.58%	6.49%
Callan Target Date 2025	0.99%	4.56%	7.04%	5.70%	7.22%
SERS 2030 Retirement Fund	0.93%	4.80%	7.74%	6.16%	7.24%
BlackRock 2030 Index	0.90%	4.68%	7.56%	5.98%	7.06%
Callan Target Date 2030	0.80%	3.95%	7.83%	6.21%	7.85%
SERS 2035 Retirement Fund	0.73%	4.21%	8.40%	6.56%	7.79%
BlackRock 2035 Index	0.70%	4.05%	8.19%	6.36%	7.59%
Callan Target Date 2035	0.62%	3.23%	8.32%	6.57%	8.25%
SERS 2040 Retirement Fund	0.55%	3.63%	8.96%	6.90%	8.25%
BlackRock 2040 Index	0.54%	3.50%	8.73%	6.67%	8.05%
Callan Target Date 2040	0.43%	2.53%	8.71%	6.72%	8.66%
SERS 2045 Retirement Fund	0.42%	3.19%	9.28%	7.08%	8.63%
BlackRock 2045 Index	0.39%	2.99%	9.00%	6.84%	8.40%
Callan Target Date 2045	0.30%	2.11%	8.97%	6.91%	8.82%
SERS 2050 Retirement Fund	0.36%	3.02%	9.37%	7.15%	8.86%
BlackRock 2050 Index	0.34%	2.80%	9.10%	6.90%	8.64%
Callan Target Date 2050	0.28%	1.99%	9.06%	6.96%	8.95%
SERS 2055 Retirement Fund	0.36%	3.02%	9.37%	7.16%	9.03%
BlackRock 2055 Index	0.34%	2.81%	9.10%	6.91%	8.82%
Callan Target Date 2055	0.25%	1.94%	9.12%	7.05%	8.91%
SERS 2060 Retirement Fund	0.35%	2.99%	9.34%	-	-
BlackRock 2060 Index	0.34%	2.81%	9.10%	-	-
Callan Target Date 2060	0.28%	1.98%	9.24%	7.19%	9.42%

Investment Fund Returns

The table below details the rates of return for the Fund's investment funds over various time periods ended September 30, 2019. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized.

Returns for Periods Ended September 30, 2019

	Last 10 Years	Last 15 Years	Last 20 Years
Gross Performance			
Target Date Funds			
SERS Post Retirement Fund	6.07%	-	-
BlackRock Post Retirement Index	5.99%	5.50%	5.59%
Callan Tgt Date 2000-2010	6.29%	4.92%	-
SERS 2020 Retirement Fund	6.87%	-	-
BlackRock 2020 Index	6.78%	5.89%	5.10%
Callan Target Date 2020	7.37%	5.56%	4.71%
SERS 2025 Retirement Fund	7.46%	-	-
BlackRock 2025 Index	7.33%	6.17%	5.16%
Callan Target Date 2025	8.05%	6.49%	-
SERS 2030 Retirement Fund	7.94%	-	-
BlackRock 2030 Index	7.80%	6.41%	5.18%
Callan Target Date 2030	8.50%	6.06%	4.84%
SERS 2035 Retirement Fund	8.40%	-	-
BlackRock 2035 Index	8.23%	6.61%	5.19%
Callan Target Date 2035	8.89%	6.94%	-
SERS 2040 Retirement Fund	8.77%	-	-
BlackRock 2040 Index	8.60%	6.77%	5.16%
Callan Target Date 2040	9.09%	6.42%	4.35%
SERS 2045 Retirement Fund	9.07%	-	-
BlackRock 2045 Index	8.88%	6.89%	5.12%
Callan Target Date 2045	9.10%	7.48%	-
SERS 2050 Retirement Fund	9.29%	-	-
BlackRock 2050 Index	9.10%	7.17%	6.27%
Callan Target Date 2050	9.21%	-	-

(1) Funds not listed do not have longer term history.

Investment Fund Returns

The table below details the rates of return for the Fund's investment funds over various time periods ended September 30, 2019. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized.

Returns for Periods Ended September 30, 2019

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 7 Years
Gross Performance					
Domestic Equity					
SERS U.S. Large Company Idx Fund	1.70%	4.27%	13.41%	10.86%	13.27%
S&P 500 Index	1.70%	4.25%	13.39%	10.84%	13.26%
Callan Lg Cap Broad MF	0.76%	2.27%	12.67%	9.74%	12.54%
SERS U.S. All Company Index Fund	0.78%	2.54%	12.66%	10.37%	12.94%
Russell 3000 Index	1.16%	2.92%	12.83%	10.44%	13.00%
Callan Multi Cap Brd MF	0.50%	0.96%	11.08%	8.64%	11.79%
SERS U.S. SMID Company Idx Fund	(1.52%)	(3.60%)	10.09%	8.59%	11.74%
Dow Jones US Completion	(1.64%)	(3.95%)	9.84%	8.36%	11.50%
Callan SMID Broad MFs	(1.77%)	(4.42%)	10.81%	8.51%	10.97%
International Equity					
SERS Global Non-U.S. Index Fund	(1.76%)	(0.83%)	6.60%	3.21%	5.27%
MSCI ACWI ex US	(1.80%)	(1.23%)	6.33%	2.90%	5.01%
Callan Non US Equity MFs	(1.29%)	(2.22%)	5.94%	3.16%	5.85%
Domestic Fixed Income					
SERS Short Term Investment Fund	0.59%	2.43%	1.73%	1.16%	0.88%
3-month Treasury Bill	0.56%	2.39%	1.54%	0.98%	0.72%
Callan Cash Database(1)	0.64%	2.79%	1.89%	1.41%	1.16%
SERS U.S. TIPS Index Fund	1.32%	7.11%	-	-	-
Blmbg US TIPS	1.35%	7.13%	2.21%	2.45%	1.06%
Callan TIPS MFs	1.10%	6.16%	2.14%	1.99%	0.84%
SERS U.S. Short Term Bond Idx Fund	0.69%	4.62%	-	-	-
Blmbg Gov/Cred 1-3 Yr	0.69%	4.64%	1.82%	1.59%	1.33%
Callan Short US Govt MFs	0.64%	4.19%	1.33%	1.31%	0.95%
SERS U.S. Bond Index Fund	2.25%	10.29%	2.91%	3.35%	2.67%
Blmbg Aggregate	2.27%	10.30%	2.92%	3.38%	2.72%
Callan Core Bond MFs	2.25%	10.14%	3.12%	3.36%	2.73%

(1) Callan Cash Database includes STIF, enhanced cash, and money market funds.

Investment Fund Returns

The table below details the rates of return for the Fund's investment funds over various time periods ended September 30, 2019. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized.

Returns for Periods Ended September 30, 2019			
	Last 10 Years	Last 15 Years	Last 20 Years
Gross Performance			
Domestic Equity			
SERS U.S. Large Company Idx Fund	13.27%	9.06%	6.39%
S&P 500 Index	13.24%	9.01%	6.33%
Callan Lg Cap Broad MF	12.43%	8.83%	6.37%
Russell 3000 Index	13.08%	9.10%	6.72%
Callan Multi Cap Brd MF	11.69%	8.43%	7.12%
SERS U.S. SMID Company Idx Fund	12.53%	9.67%	8.41%
Dow Jones US Completion	12.31%	9.45%	8.06%
Callan SMID Broad MFs	12.13%	9.31%	8.88%
International Equity			
SERS Global Non-U.S. Index Fund	4.67%	-	-
MSCI ACWI ex US	4.46%	5.66%	-
Callan Non US Equity MFs	5.18%	5.65%	4.48%
Domestic Fixed Income			
SERS Short Term Investment Fund	0.69%	1.56%	-
3-month Treasury Bill	0.54%	1.39%	1.82%
Callan Cash Database(1)	1.02%	1.87%	2.36%
Blmbg US TIPS	3.46%	3.90%	5.47%
Callan TIPS MFs	3.17%	3.63%	4.67%
Blmbg Gov/Cred 1-3 Yr	1.52%	2.43%	3.19%
Callan Short US Govt MFs	1.34%	2.31%	3.13%
SERS U.S. Bond Index Fund	3.70%	4.17%	4.98%
Blmbg Aggregate	3.75%	4.21%	5.01%
Callan Core Bond MFs	4.01%	4.46%	5.07%

(1) Callan Cash Database includes STIF, enhanced cash, and money market funds.

(2) Funds not listed do not have longer term history.

Investment Fund Returns

The table below details the rates of return for the Fund's investment funds over various time periods. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized.

	12/2018- 9/2019	2018	2017	2016	2015
Gross Performance					
Target Date Funds					
SERS Post Retirement Fund	11.70%	(3.41%)	10.25%	6.18%	(1.06%)
BlackRock Post Retirement Index	11.64%	(3.48%)	10.10%	6.01%	(1.07%)
Callan Tgt Date 2000-2010	10.68%	(3.15%)	10.16%	5.79%	(0.48%)
SERS 2020 Retirement Fund	12.04%	(3.81%)	11.85%	6.72%	(1.19%)
BlackRock 2020 Index	11.96%	(3.88%)	11.67%	6.51%	(1.28%)
Callan Target Date 2020	11.93%	(4.29%)	12.61%	6.51%	(1.03%)
SERS 2025 Retirement Fund	13.19%	(4.80%)	13.99%	7.37%	(1.36%)
BlackRock 2025 Index	13.09%	(4.90%)	13.75%	7.10%	(1.45%)
Callan Target Date 2025	13.07%	(5.19%)	15.03%	7.08%	(1.19%)
SERS 2030 Retirement Fund	14.12%	(5.63%)	15.91%	7.96%	(1.53%)
BlackRock 2030 Index	14.00%	(5.76%)	15.64%	7.61%	(1.66%)
Callan Target Date 2030	13.95%	(6.12%)	16.81%	7.58%	(1.31%)
SERS 2035 Retirement Fund	15.00%	(6.43%)	17.77%	8.49%	(1.72%)
BlackRock 2035 Index	14.84%	(6.58%)	17.48%	8.08%	(1.86%)
Callan Target Date 2035	14.79%	(7.03%)	18.54%	8.20%	(1.46%)
SERS 2040 Retirement Fund	15.77%	(7.17%)	19.44%	8.94%	(1.92%)
BlackRock 2040 Index	15.63%	(7.33%)	19.09%	8.51%	(2.08%)
Callan Target Date 2040	15.30%	(7.89%)	19.84%	8.48%	(1.55%)
SERS 2045 Retirement Fund	16.33%	(7.78%)	20.54%	9.24%	(2.07%)
BlackRock 2045 Index	16.17%	(7.99%)	20.15%	8.77%	(2.22%)
Callan Target Date 2045	15.69%	(8.21%)	20.63%	8.63%	(1.58%)
SERS 2050 Retirement Fund	16.58%	(8.05%)	20.92%	9.32%	(2.12%)
BlackRock 2050 Index	16.41%	(8.26%)	20.55%	8.82%	(2.26%)
Callan Target Date 2050	15.76%	(8.44%)	20.74%	8.61%	(1.56%)
SERS 2055 Retirement Fund	16.61%	(8.07%)	20.90%	9.30%	(2.10%)
BlackRock 2055 Index	16.45%	(8.28%)	20.55%	8.82%	(2.26%)
Callan Target Date 2055	15.83%	(8.44%)	21.12%	8.65%	(1.69%)
SERS 2060 Retirement Fund	16.59%	(8.08%)	20.85%	9.32%	(2.07%)
BlackRock 2060 Index	16.45%	(8.28%)	20.55%	8.82%	(2.16%)
Callan Target Date 2060	15.81%	(8.35%)	21.14%	8.80%	(1.57%)

Investment Fund Returns

The table below details the rates of return for the Fund's investment funds over various time periods. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized.

	12/2018- 9/2019	2018	2017	2016	2015
Gross Performance					
Domestic Equity					
SERS U.S. Large Company Idx Fund	20.57%	(4.38%)	21.85%	11.99%	1.41%
S&P 500 Index	20.55%	(4.38%)	21.83%	11.96%	1.38%
Callan Lg Cap Broad MF	19.76%	(4.54%)	23.56%	8.43%	1.50%
SERS U.S. All Company Index Fund	19.65%	(5.28%)	21.08%	12.72%	0.47%
Russell 3000 Index	20.09%	(5.24%)	21.13%	12.74%	0.48%
Callan Multi Cap Brd MF	19.21%	(6.82%)	20.75%	9.05%	(1.26%)
SERS U.S. SMID Company Idx Fund	17.78%	(9.32%)	18.21%	16.08%	(3.30%)
Dow Jones US Completion	17.54%	(9.57%)	18.12%	15.75%	(3.42%)
Callan SMID Broad MFs	18.99%	(8.69%)	17.14%	13.80%	(2.80%)
International Equity					
SERS Global Non-U.S. Index Fund	12.00%	(13.85%)	27.65%	5.07%	(5.56%)
MSCI ACWI ex US	11.56%	(14.20%)	27.19%	4.50%	(5.66%)
Callan Non US Equity MFs	13.22%	(15.04%)	26.90%	0.23%	0.02%
Domestic Fixed Income					
SERS Short Term Investment Fund	1.82%	2.09%	1.08%	0.59%	0.19%
3-month Treasury Bill	1.81%	1.87%	0.86%	0.33%	0.05%
Callan Cash Database(1)	2.19%	2.00%	1.19%	0.95%	0.40%
SERS U.S. TIPS Index Fund	7.54%	(1.25%)	-	-	-
Blmbg US TIPS	7.58%	(1.26%)	3.01%	4.68%	(1.44%)
Callan TIPS MFs	7.40%	(1.53%)	3.12%	4.63%	(1.76%)
SERS U.S. Short Term Bond Idx Fund	3.41%	1.58%	-	-	-
Blmbg Gov/Cred 1-3 Yr	3.42%	1.60%	0.84%	1.28%	0.65%
Callan Short US Govt MFs	3.21%	1.15%	0.59%	0.64%	0.35%
SERS U.S. Bond Index Fund	8.50%	0.03%	3.53%	2.59%	0.49%
Blmbg Aggregate	8.52%	0.01%	3.54%	2.65%	0.55%
Callan Core Bond MFs	8.80%	(0.35%)	3.71%	3.03%	0.10%

(1) Callan Cash Database includes STIF, enhanced cash, and money market funds.

Pennsylvania SERS 401(a)
Investment Manager Performance Monitoring Summary Report
September 30, 2019

Investment Manager	Last Quarter Return	Last Year Return	3 Year Return	5 Year Return	7 Year Return	10 Year Return	5 Year Return Consistency	5 Year Risk Quadrant	Expense Ratio
Gross of Fee Performance									
Target Date Funds									
SERS Post Retirement Fund Callan Tgt Date 2000-2010	1.4 14	6.5 20	5.7 45	4.8 43	5.1 68	6.1 68			0.08 100
BlackRock Post Retirement Index	1.4 17	6.4 21	5.6 46	4.8 46	5.0 73	6.0 70			
SERS 2020 Retirement Fund Callan Target Date 2020	1.4 19	6.1 19	6.2 56	5.2 53	5.9 66	6.9 61			0.08 97
BlackRock 2020 Index	1.3 19	6.0 19	6.1 63	5.1 64	5.8 68	6.8 63			
SERS 2025 Retirement Fund Callan Target Date 2025	1.1 25	5.4 19	7.0 48	5.7 48	6.6 70	7.5 72			0.08 96
BlackRock 2025 Index	1.1 30	5.3 23	6.9 61	5.6 64	6.5 72	7.3 75			
SERS 2030 Retirement Fund Callan Target Date 2030	0.9 32	4.8 16	7.7 56	6.2 55	7.2 70	7.9 65			0.08 97
BlackRock 2030 Index	0.9 33	4.7 21	7.6 65	6.0 66	7.1 75	7.8 72			
SERS 2035 Retirement Fund Callan Target Date 2035	0.7 35	4.2 14	8.4 44	6.6 51	7.8 72	8.4 69			0.08 97
BlackRock 2035 Index	0.7 40	4.1 16	8.2 58	6.4 64	7.6 78	8.2 72			
SERS 2040 Retirement Fund Callan Target Date 2040	0.5 37	3.6 13	9.0 38	6.9 41	8.3 69	8.8 60			0.08 98
BlackRock 2040 Index	0.5 37	3.5 17	8.7 49	6.7 53	8.1 77	8.6 64			
SERS 2045 Retirement Fund Callan Target Date 2045	0.4 36	3.2 17	9.3 35	7.1 38	8.6 64	9.1 52			0.08 97
BlackRock 2045 Index	0.4 39	3.0 22	9.0 47	6.8 54	8.4 75	8.9 62			
SERS 2050 Retirement Fund Callan Target Date 2050	0.4 36	3.0 19	9.4 34	7.2 40	8.9 53	9.3 44			0.08 97
BlackRock 2050 Index	0.3 38	2.8 25	9.1 47	6.9 53	8.6 73	9.1 58			
SERS 2055 Retirement Fund Callan Target Date 2055	0.3 35	3.0 16	9.4 36	7.2 47	9.0 43				0.08 97
BlackRock 2055 Index	0.3 36	2.8 24	9.1 53	6.9 53	8.8 53				

Returns:
■ above median
■ third quartile
■ fourth quartile

Return Consistency:
■ above median
■ third quartile
■ fourth quartile

Risk Quadrant:


Expense Ratio:
■ below median
■ second quartile
■ first quartile

Pennsylvania SERS 401(a)
Investment Manager Performance Monitoring Summary Report
September 30, 2019

Investment Manager	Last Quarter Return	Last Year Return	3 Year Return	5 Year Return	7 Year Return	10 Year Return	5 Year Return Consistency	5 Year Risk Quadrant	Expense Ratio
SERS 2060 Retirement Fund Callan Target Date 2060	0.3 36	3.0 15	9.3 44						0.08 96
BlackRock 2060 Index	0.3 37	2.8 23	9.1 57						
Domestic Equity									
SERS U.S. Large Company Stock Index Fund Callan Lg Cap Broad MF	1.7 24	4.3 29	13.4 43	10.9 38	13.3 36	13.3 35			0.01 99
S&P 500 Index	1.7 24	4.3 29	13.4 44	10.8 38	13.3 37	13.2 36			
SERS U.S. All Company Index Fund Callan Multi Cap Brd MF	0.8 43	2.5 37	12.7 34	10.4 27	12.9 28				0.03 99
Russell 3000 Index	1.2 32	2.9 33	12.8 33	10.4 26	13.0 27	13.1 24			
U.S. Small/Mid Company Stock Index Fund Callan SMID Broad MFs	-1.5 49	-3.6 44	10.1 55	8.6 50	11.7 36	12.5 41			0.03 100
Dow Jones US Completion	-1.6 49	-4.0 46	9.8 58	8.4 51	11.5 41	12.3 44			
International Equity									
SERS Global Non-U.S. Index Fund Callan Non US Equity MFs	-1.8 64	-0.8 35	6.6 40	3.2 49	5.3 70	4.7 62			0.06 100
MSCI ACWI ex US	-1.8 65	-1.2 37	6.3 45	2.9 54	5.0 75	4.5 65			
Domestic Fixed Income									
SERS Short Term Investment Fund Callan Cash Database	0.6 78	2.4 88	1.7 80	1.2 85	0.9 86	0.7 86			0.00 100
3-month Treasury Bill	0.6 91	2.4 94	1.5 94	1.0 97	0.7 97	0.5 97			
Comments: Callan Cash Database includes STIF, enhanced cash, and money market funds.									
SERS U.S. Short Term Bond Idx Fund Callan Short US Govt MFs	0.7 46	4.6 45							0.03 99
Blmbg Gov/Cred 1-3 Yr	0.7 46	4.6 44	1.8 10	1.6 21	1.3 7	1.5 37			
SERS U.S. TIPS Index Fund Callan TIPS MFs	1.3 30	7.1 18							0.03 99
Blmbg US TIPS	1.3 30	7.1 17	2.2 38	2.4 14	1.1 24	3.5 21			

Returns:
■ above median
■ third quartile
■ fourth quartile

Return Consistency:
■ above median
■ third quartile
■ fourth quartile

Risk Quadrant:

Return
Risk

Expense Ratio:
■ below median
■ second quartile
■ first quartile

Pennsylvania SERS 401(a)

Investment Manager Performance Monitoring Summary Report

September 30, 2019

Investment Manager	Last Quarter Return	Last Year Return	3 Year Return	5 Year Return	7 Year Return	10 Year Return	5 Year Return Consistency	5 Year Risk Quadrant	Expense Ratio
SERS U.S. Bond Index Fund	2.3 49	10.3 43	2.9 70	3.3 52	2.7 58	3.7 86	<div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div></div>	0.03 96
Callan Core Bond MFs									
Blmbg Aggregate	2.3 44	10.3 43	2.9 70	3.4 47	2.7 51	3.7 83	<div><div></div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div><div></div></div>	

Returns:

above median

third quartile

fourth quartile

Return Consistency:

above median

third quartile

fourth quartile

Risk Quadrant:

Return

Risk

Expense Ratio:

below median

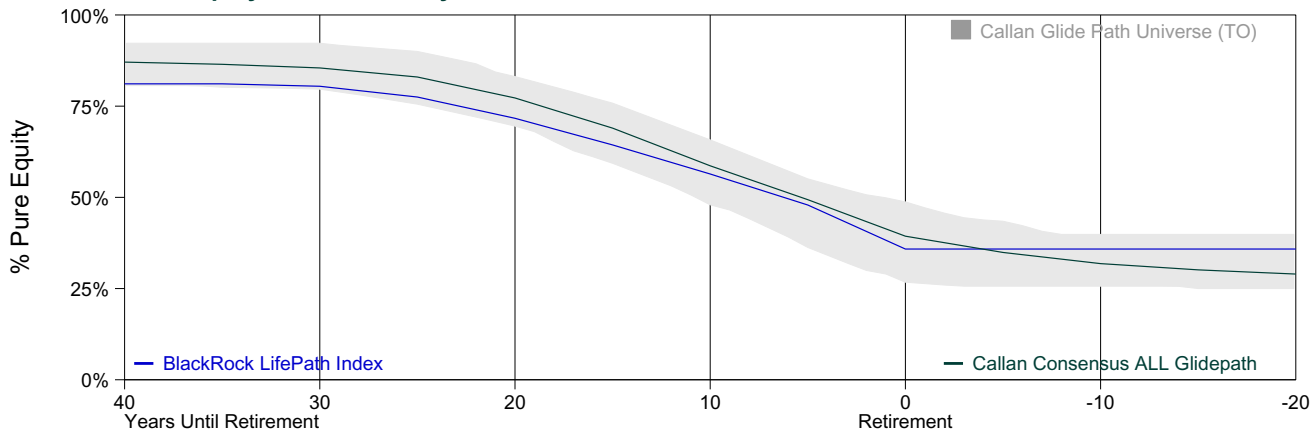
second quartile

first quartile

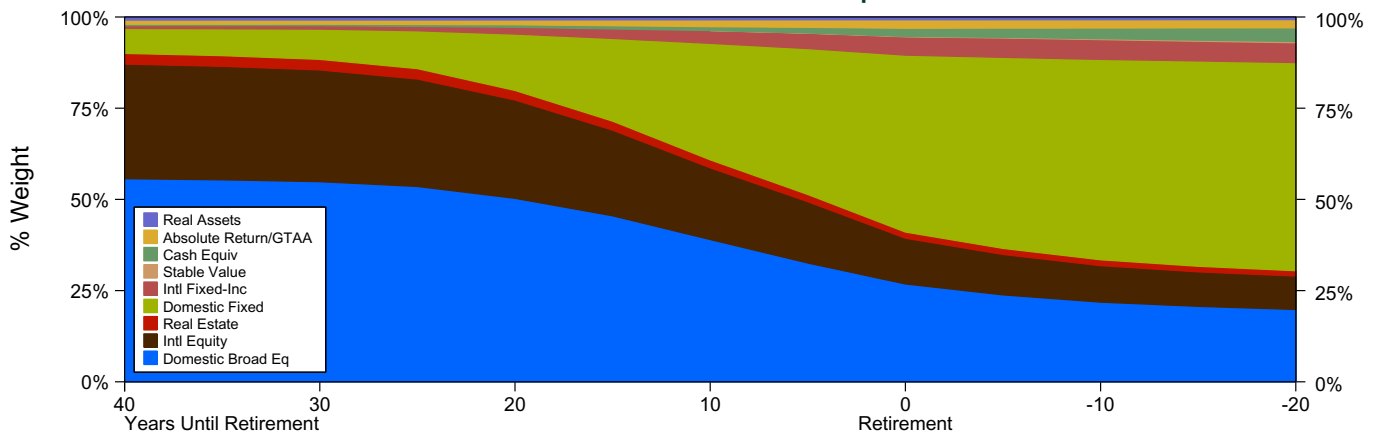
Callan Consensus ALL Glidepath Target Date Glide Path Analysis as of September 30, 2019

The following charts illustrate the asset allocation "glide path" underlying the relevant suite of target date funds. This analysis covers forty years of investor wealth accumulation up to retirement, as well as twenty years of wealth decumulation following retirement. The top chart shows the "pure" equity exposure (public equities excluding REITs) versus the peer group and index. The subsequent charts show more asset allocation detail at the high "macro" level.

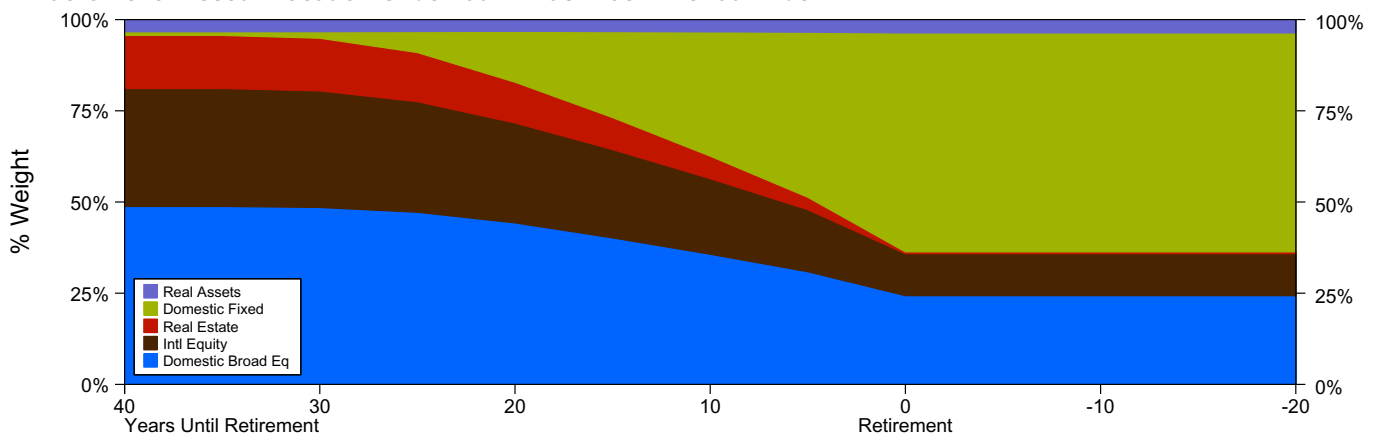
Pure Equity Rolldown Analysis



Macro-Level Asset Allocation Glide Path - Callan Consensus ALL Glidepath



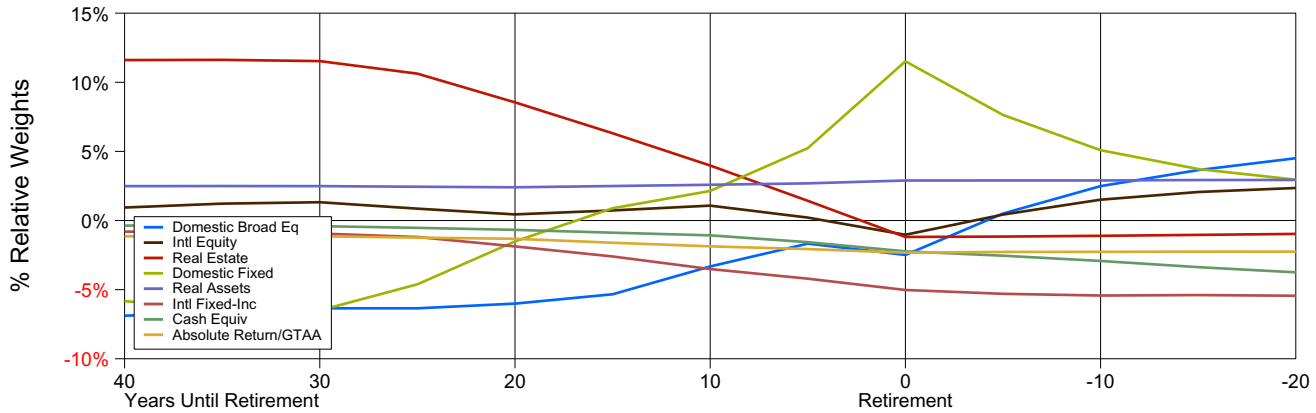
Macro-Level Asset Allocation Glide Path - BlackRock LifePath Index



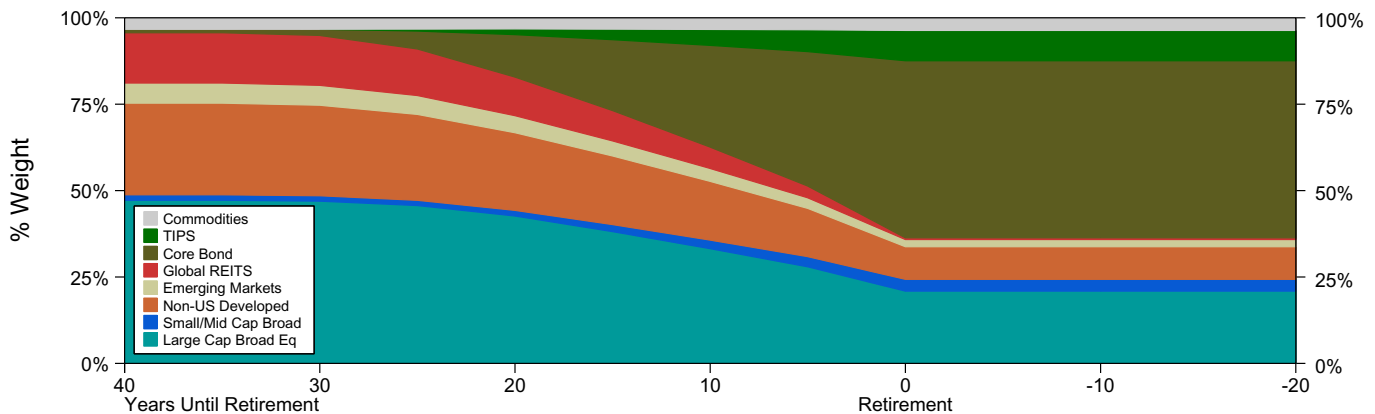
BlackRock LifePath Index Target Date Glide Path Analysis as of September 30, 2019

The following charts illustrate the asset allocation "glide path" underlying the relevant suite of target date funds. This analysis covers forty years of investor wealth accumulation up to retirement, as well as twenty years of wealth decumulation following retirement. The top chart highlights any significant "macro-level" differences between the manager's asset allocation glide path and that of the glide path index. The bottom two charts illustrate the asset allocation glide paths of both the manager and index at the more detailed "micro" level.

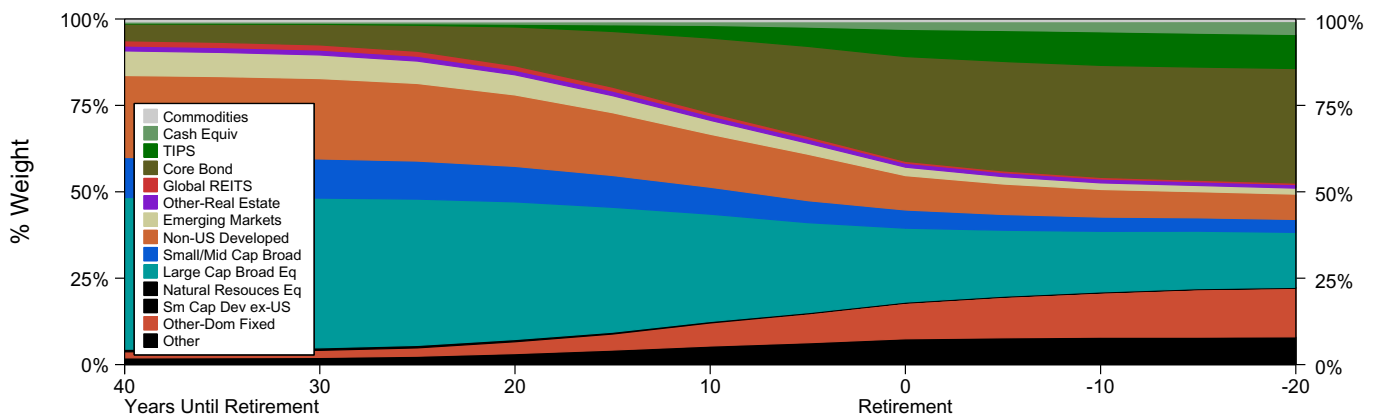
Relative Macro Asset Allocation - BlackRock LifePath Index vs. Callan Consensus ALL Glidep



Micro-Level Asset Allocation Glide Path - BlackRock LifePath Index



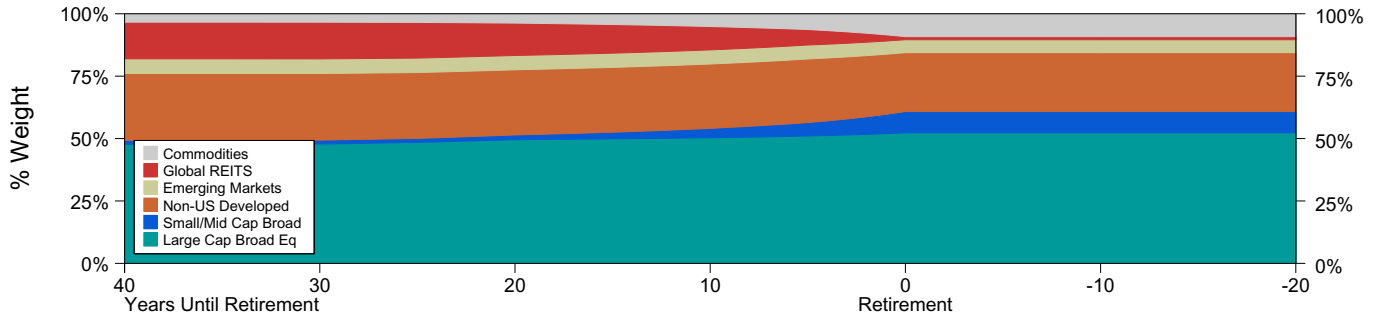
Micro-Level Asset Allocation Glide Path - Callan Consensus ALL Glidepath



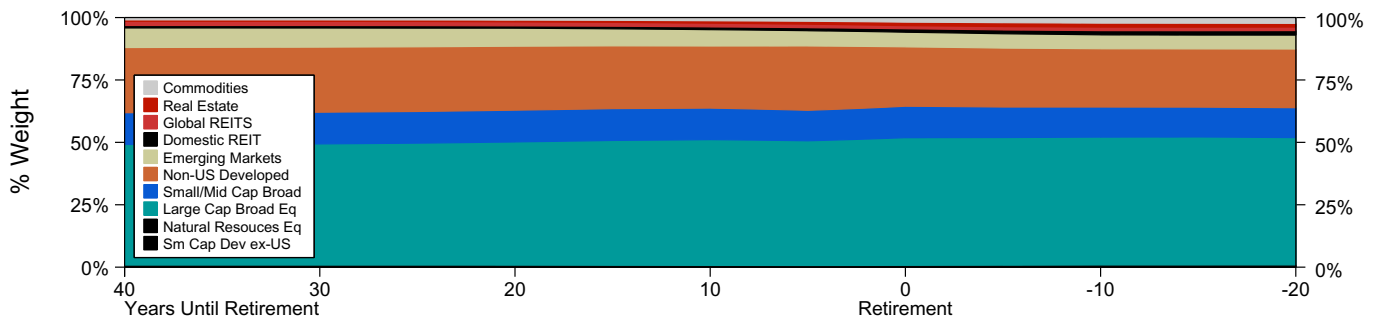
BlackRock LifePath Index Target Date Glide Path Analysis as of September 30, 2019

The first two charts below illustrate the detailed composition over time of the "risky", or "growth" portion of the glide paths for both the manager and index, defined to be all public equity and real estate asset classes. These charts highlight both the levels of diversification and aggressiveness within the wealth creation portion of the glide paths. The last two charts serve a similar purpose but focus on the composition over time of the remaining wealth preservation portion (non-equity) of the manager and index glide paths.

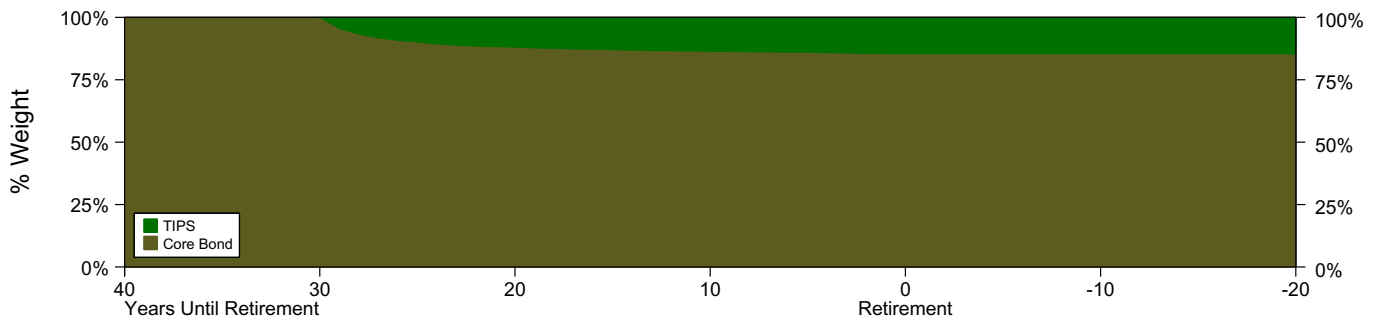
Micro-Level Equity Allocation Glide Path - BlackRock LifePath Index



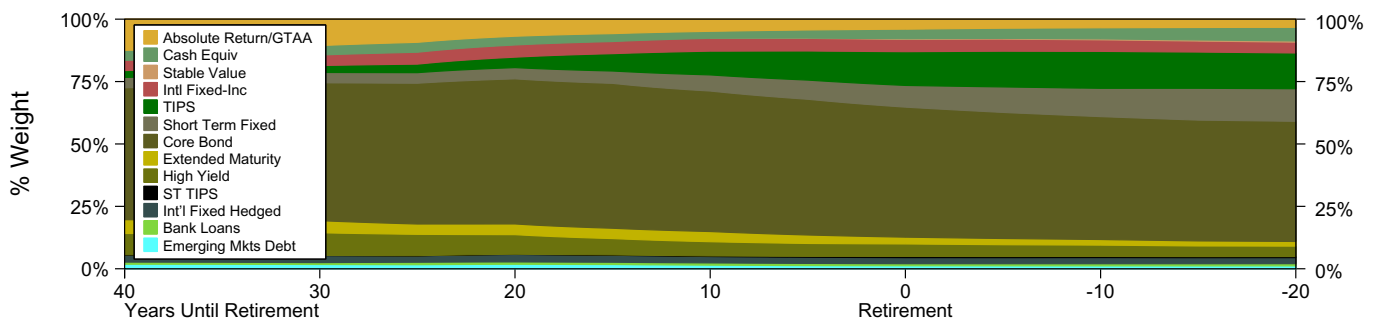
Micro-Level Equity Asset Allocation Glide Path - Callan Consensus ALL Glidepath



Micro-Level Non-Equity Allocation Glide Path - BlackRock LifePath Index



Micro-Level Non-Equity Asset Allocation Glide Path - Callan Consensus ALL Glidep



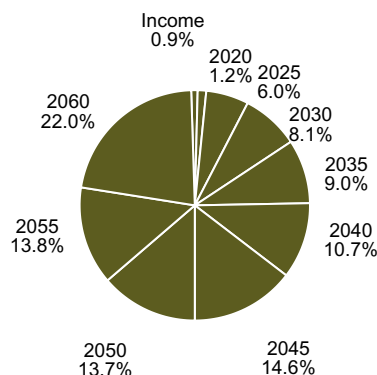
Pennsylvania SERS 401(a) - BlackRock LifePath Index Target Date Fund Family Analysis as of September 30, 2019

The following is an analysis of the client's suite of target date funds as an aggregated portfolio using actual proportions held by the client's participants. The upper-left pie chart shows the current client weights across target dates. The rest of the charts compare different attributes of the aggregated client target date portfolio to a peer group of target date fund families, as well as target date indices, by mimicking the client target date weights using these alternatives. The first two charts evaluate the aggregate client equity exposure and expense ratio via target date funds. The last two charts analyze aggregate client target date performance on both an actual return basis as well as a "glide path return" basis (simulated returns using each funds' asset allocation "glide path" weights and index returns).

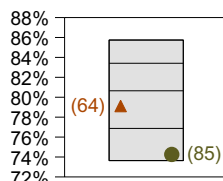
Glidepath Peer Group: ALL

Fee/Return Type: Gross

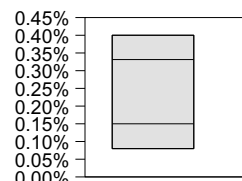
Fund Family Allocation



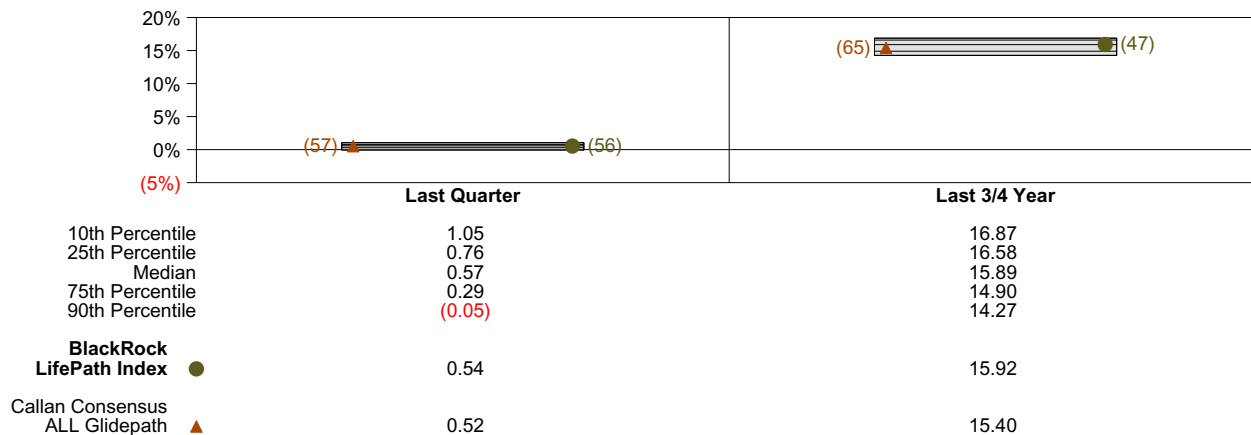
Equity Exposure



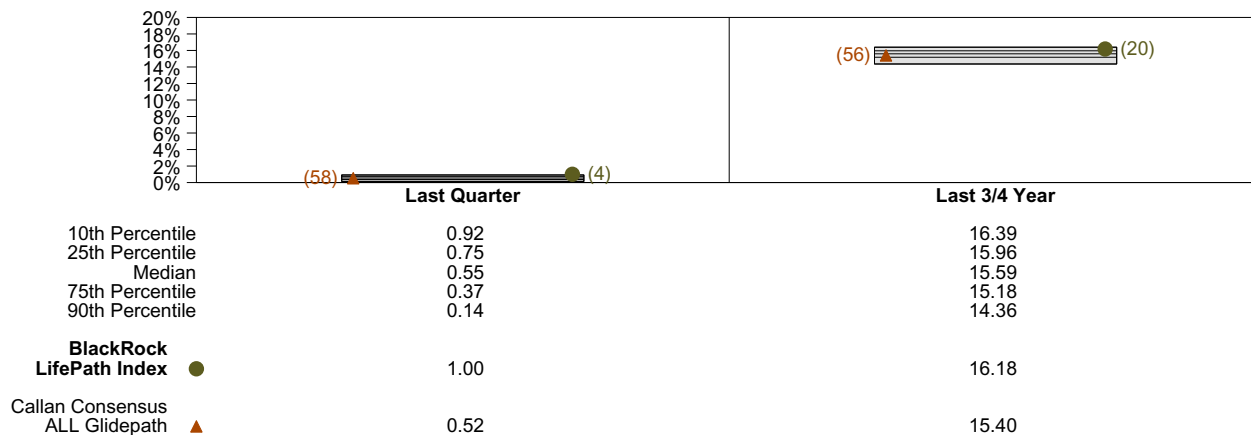
Expense Ratio



Target Date Family Performance vs Peer Families



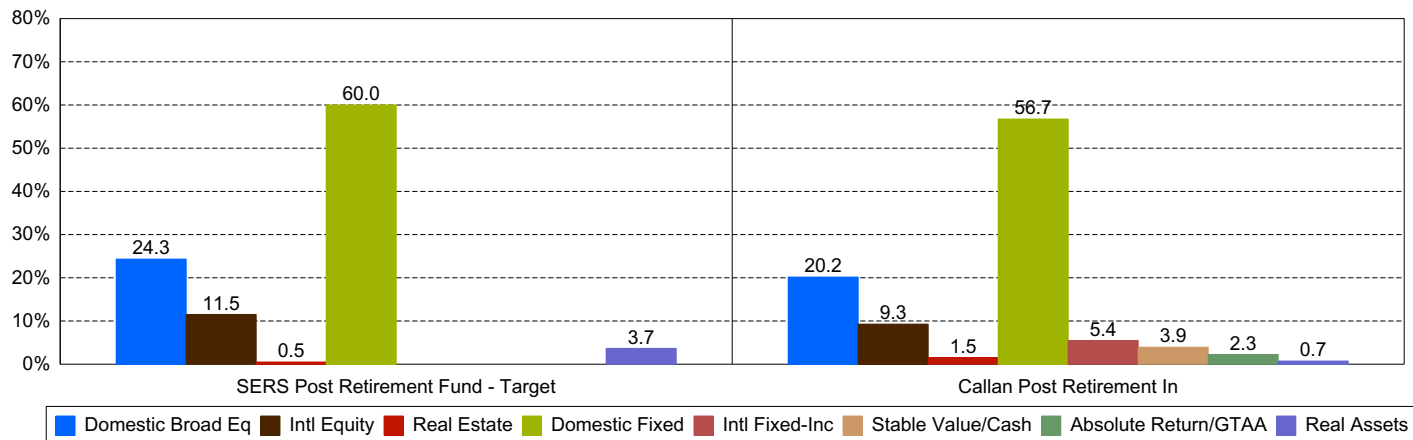
Target Date Family Glide Path Returns vs Peer Families



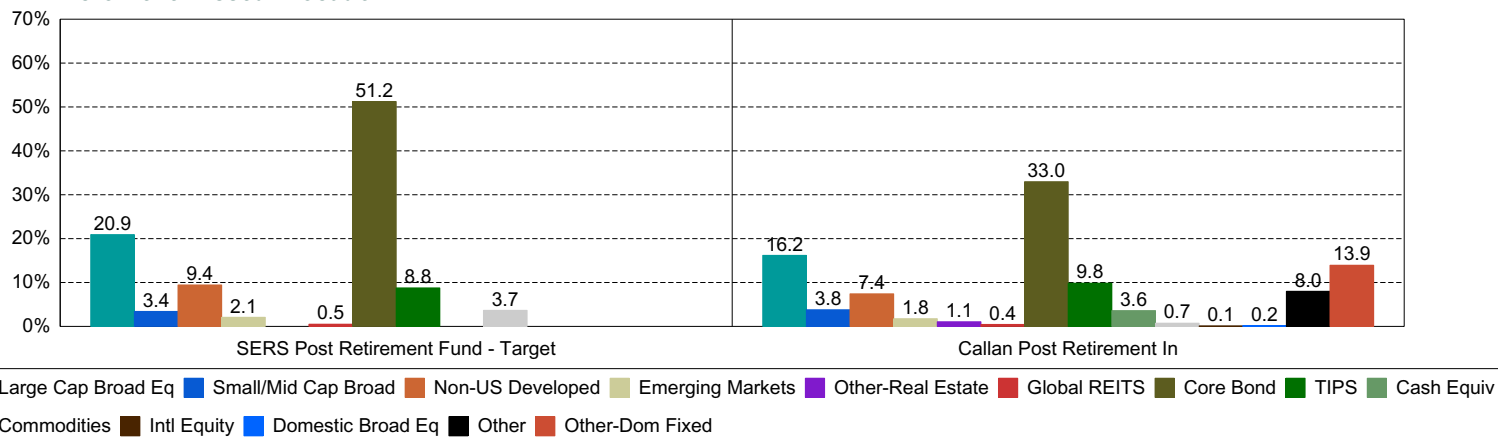
SERS Post Retirement Fund Target Date Fund Asset Allocation as of September 30, 2019

The charts below illustrate the current target asset allocation of the relevant target date fund based on its underlying glide path and compares it to an index. The top charts compare target asset allocation at a high "macro" asset class level, while the middle charts show a more detailed "micro" level view. The bottom chart compares the current "macro" level target asset allocation, and index, to a relevant peer group of target date funds by ranking the various target asset class weights versus those peer target date funds.

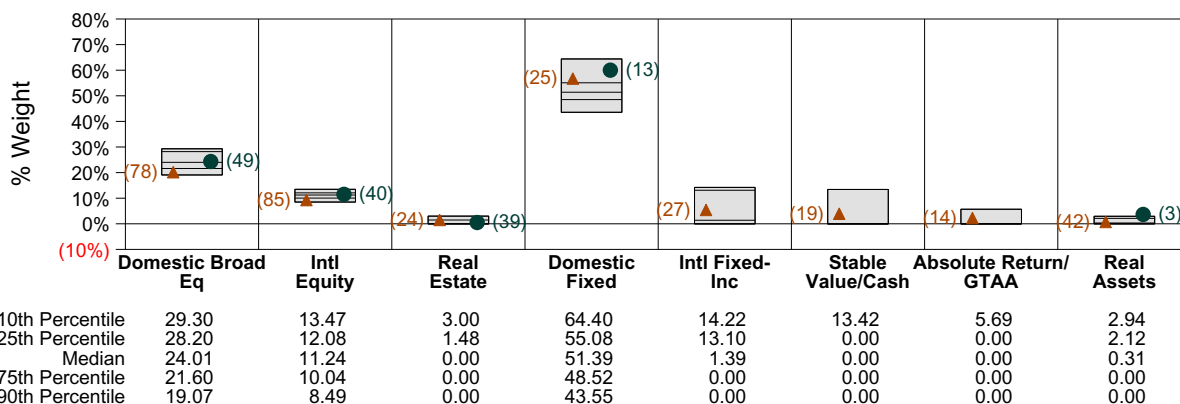
Macro-Level Asset Allocation



Micro-Level Asset Allocation



Macro Asset Allocation Rankings vs. Callan Target Date 2000-2010



SERS Post Retirement Fund - Target	●	24.32	11.51	0.50	60.01	-	-	-	3.66
Callan Post Retirement In	▲	20.16	9.27	1.50	56.74	5.42	3.92	2.25	0.73

SERS Post Retirement Fund Period Ended September 30, 2019

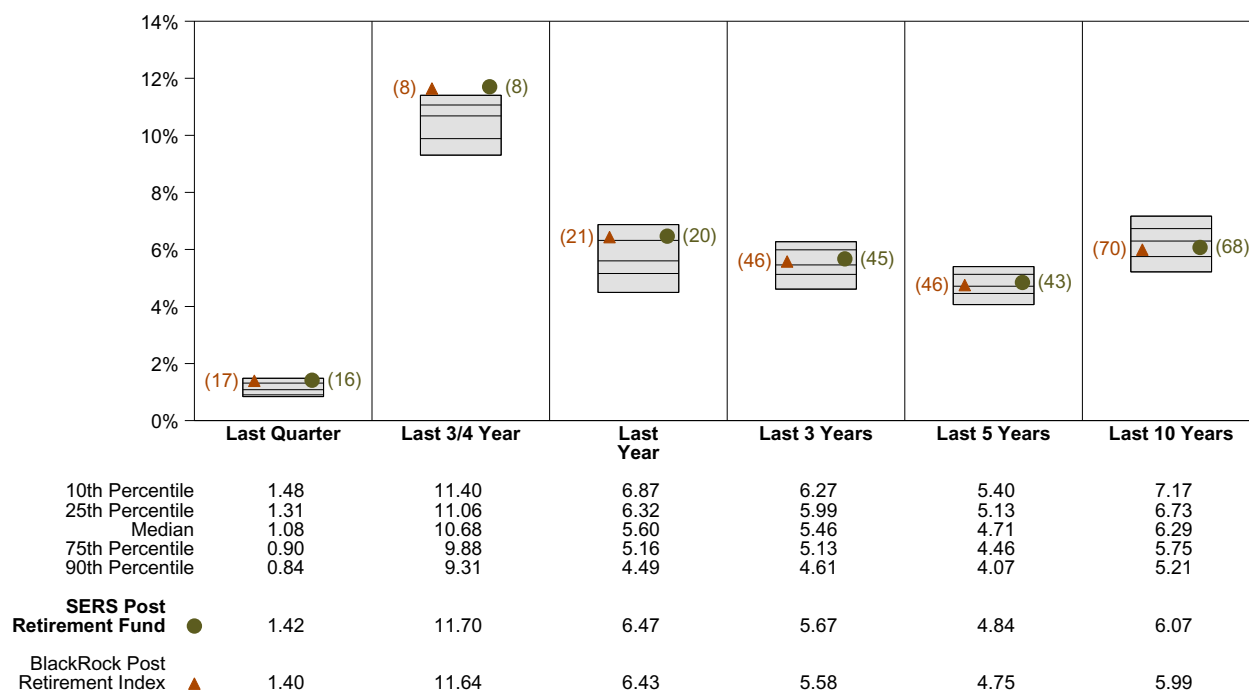
Investment Philosophy

The BlackRock LifePath(R) Index Retirement Fund (the "Fund") seeks to provide for retirement outcomes consistent with investor preferences throughout the savings and drawdown phase based on quantitatively measured risk that investors, on average, may be willing to accept. The Fund will be diversified across global asset classes, with allocations changing over the investment horizon to become more heavily oriented toward debt and debt-like securities, on the premise that individuals investing for retirement desire to reduce investment risk in their retirement accounts as their retirement date approaches.

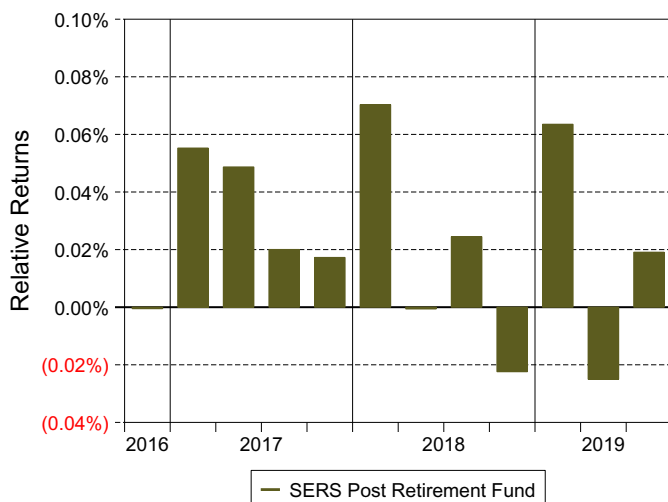
Quarterly Summary and Highlights

- SERS Post Retirement Fund's portfolio posted a 1.42% return for the quarter placing it in the 16 percentile of the Callan Target Date 2000-2010 group for the quarter and in the 20 percentile for the last year.
- SERS Post Retirement Fund's portfolio outperformed the BlackRock Post Retirement Index by 0.02% for the quarter and outperformed the BlackRock Post Retirement Index for the year by 0.03%.

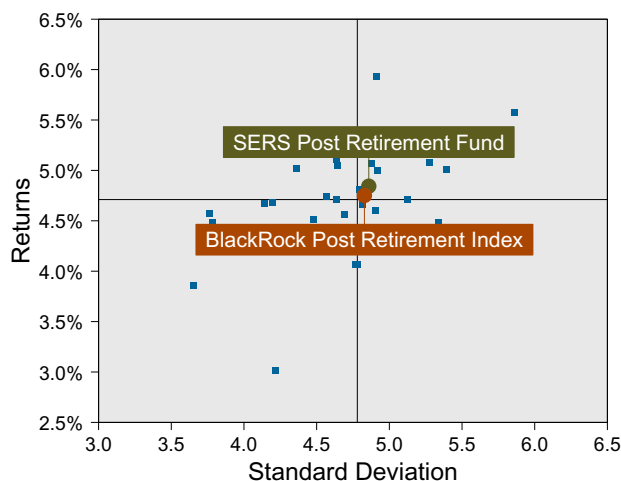
Performance vs Callan Target Date 2000-2010 (Net)



Relative Returns vs BlackRock Post Retirement Index



Callan Target Date 2000-2010 (Net) Annualized Five Year Risk vs Return

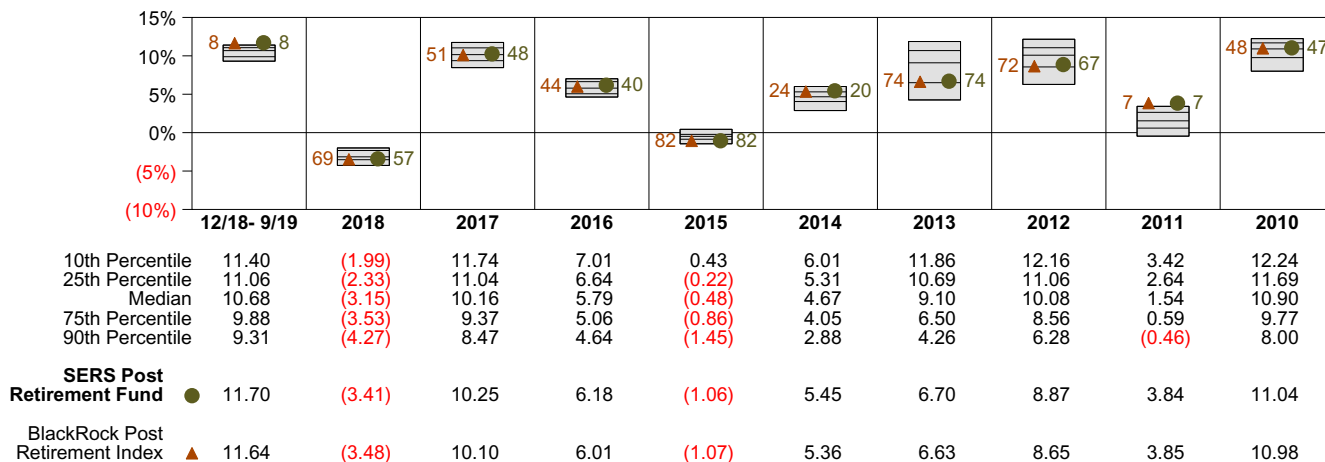


SERS Post Retirement Fund Return Analysis Summary

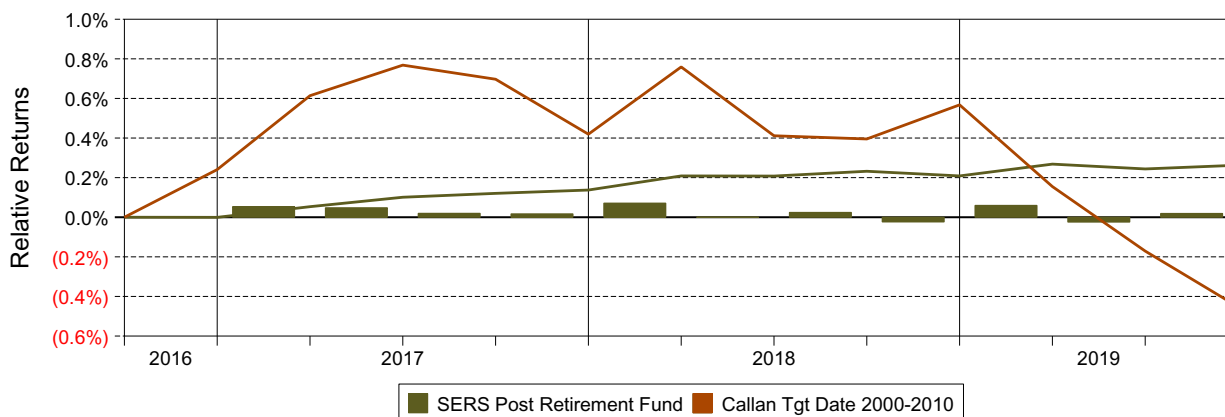
Return Analysis

The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate market benchmark. The last chart illustrates the manager's ranking relative to their style using various risk-adjusted return measures.

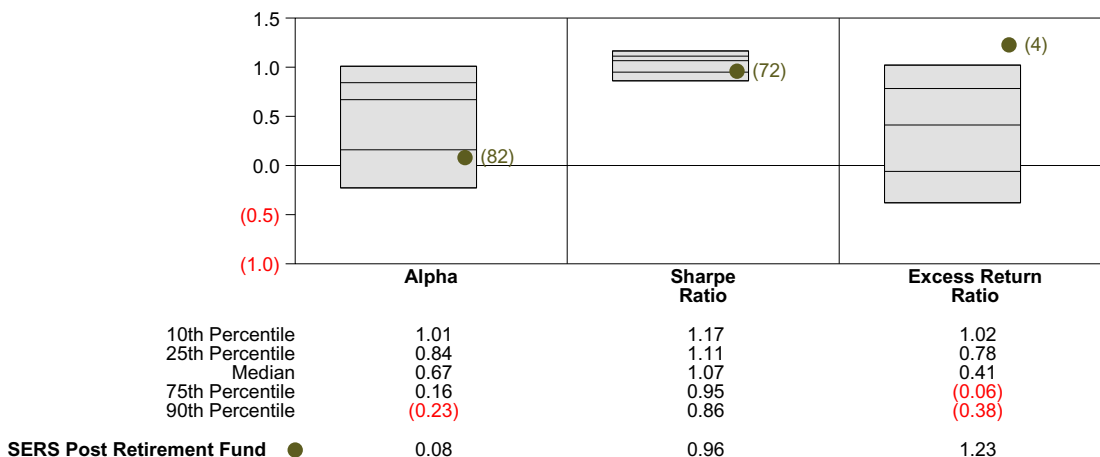
Performance vs Callan Target Date 2000-2010 (Net)



Cumulative and Quarterly Relative Return vs BlackRock Post Retirement Index



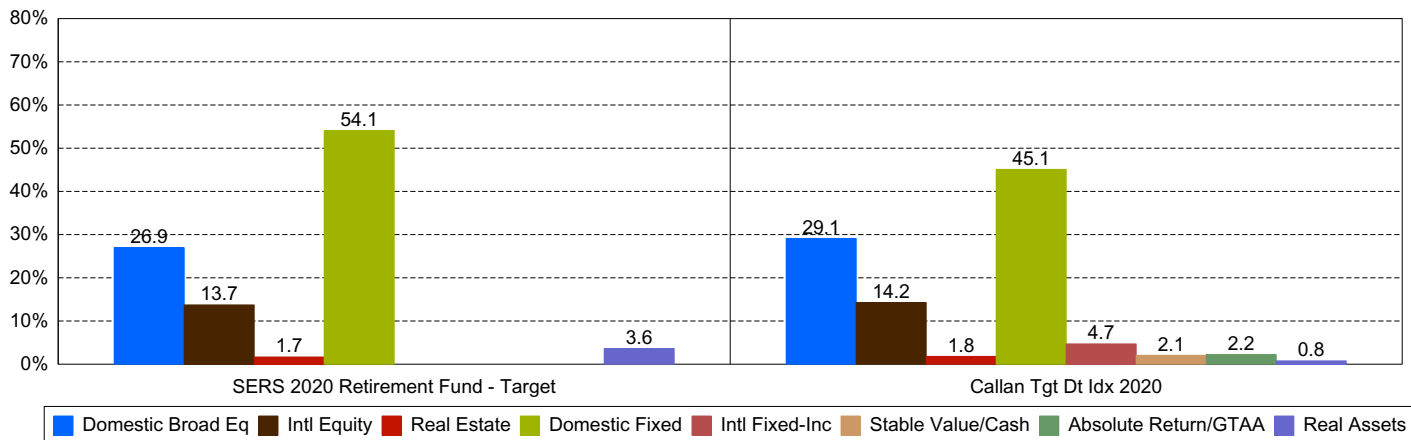
Risk Adjusted Return Measures vs BlackRock Post Retirement Index Rankings Against Callan Target Date 2000-2010 (Net) Seven Years Ended September 30, 2019



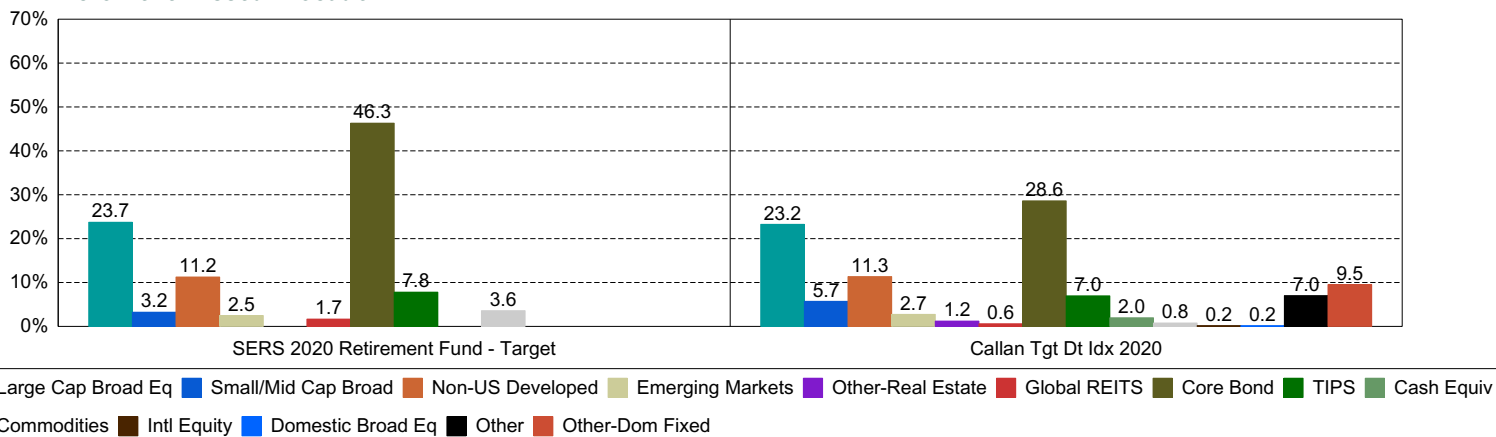
SERS 2020 Retirement Fund Target Date Fund Asset Allocation as of September 30, 2019

The charts below illustrate the current target asset allocation of the relevant target date fund based on its underlying glide path and compares it to an index. The top charts compare target asset allocation at a high "macro" asset class level, while the middle charts show a more detailed "micro" level view. The bottom chart compares the current "macro" level target asset allocation, and index, to a relevant peer group of target date funds by ranking the various target asset class weights versus those peer target date funds.

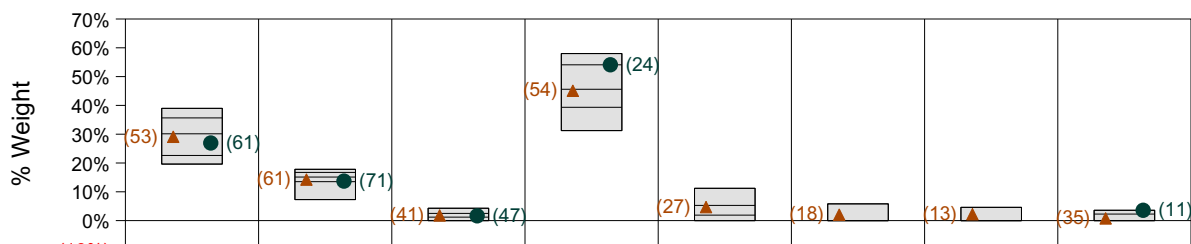
Macro-Level Asset Allocation



Micro-Level Asset Allocation



Macro Asset Allocation Rankings vs. Callan Target Date 2020



SERS 2020 Retirement Fund - Target

●	26.95	13.71	1.66	54.10	-	-	-	3.58
▲	29.11	14.25	1.80	45.09	4.70	2.06	2.22	0.77

SERS 2020 Retirement Fund Period Ended September 30, 2019

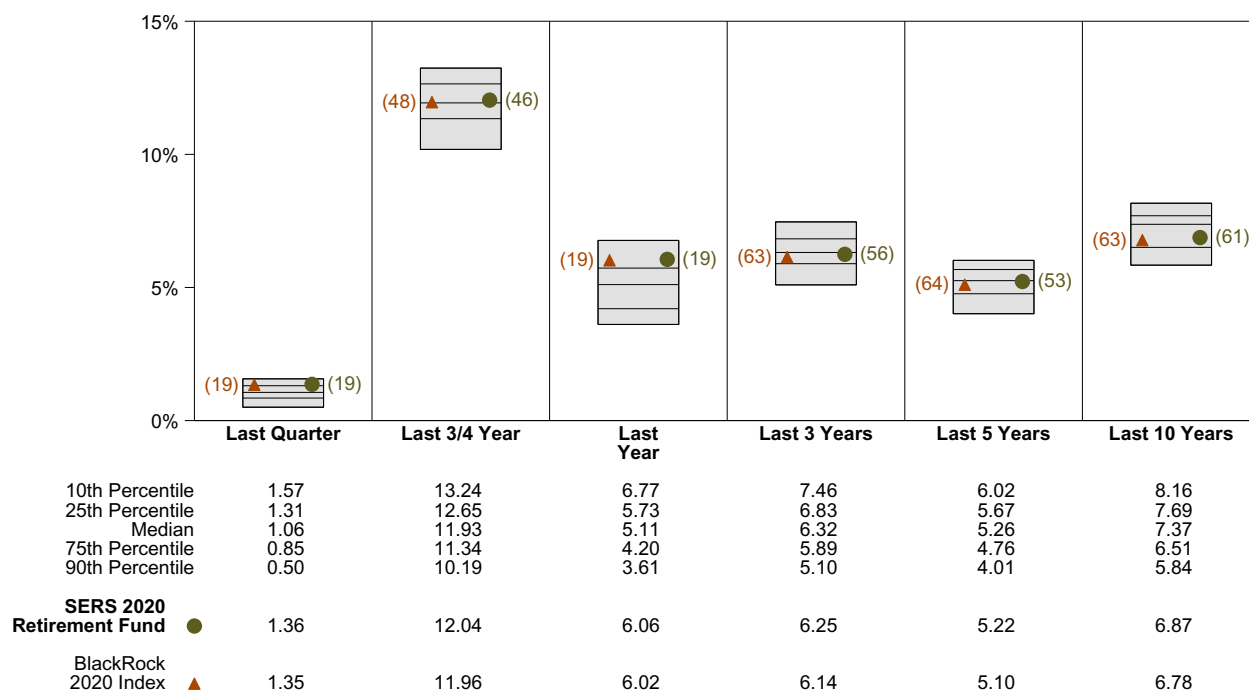
Investment Philosophy

The BlackRock LifePath(R) Index 2020 Fund (the "Fund") seeks to provide for retirement outcomes consistent with investor preferences throughout the savings and drawdown phase based on quantitatively measured risk that investors, on average, may be willing to accept. The Fund will be diversified across global asset classes, with allocations changing over the investment horizon to become more heavily oriented toward debt and debt-like securities, on the premise that individuals investing for retirement desire to reduce investment risk in their retirement accounts as their retirement date approaches.

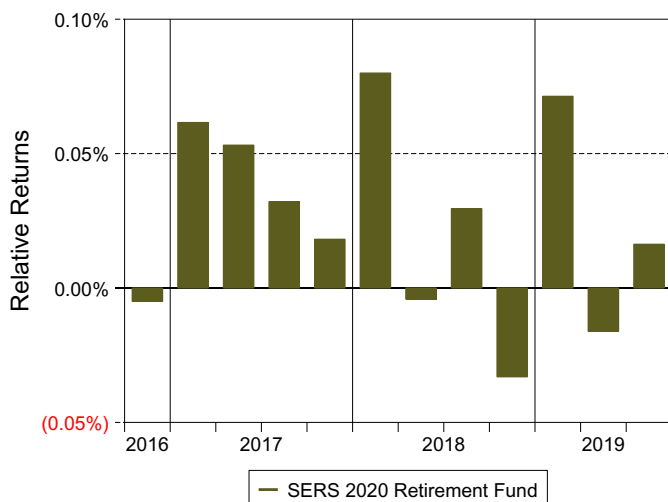
Quarterly Summary and Highlights

- SERS 2020 Retirement Fund's portfolio posted a 1.36% return for the quarter placing it in the 19 percentile of the Callan Target Date 2020 group for the quarter and in the 19 percentile for the last year.
- SERS 2020 Retirement Fund's portfolio outperformed the BlackRock 2020 Index by 0.02% for the quarter and outperformed the BlackRock 2020 Index for the year by 0.03%.

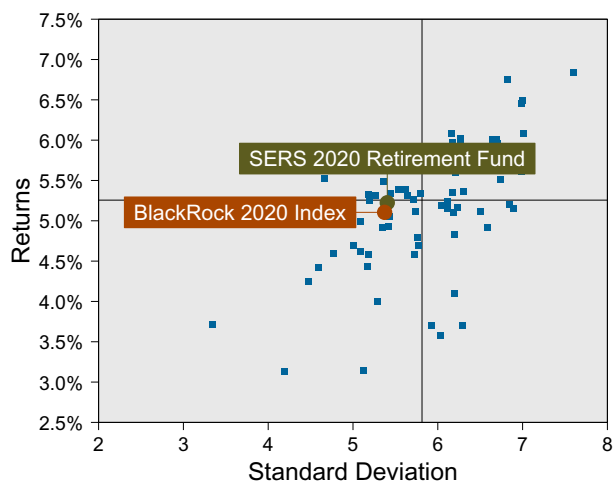
Performance vs Callan Target Date 2020 (Net)



Relative Return vs BlackRock 2020 Index



Callan Target Date 2020 (Net) Annualized Five Year Risk vs Return

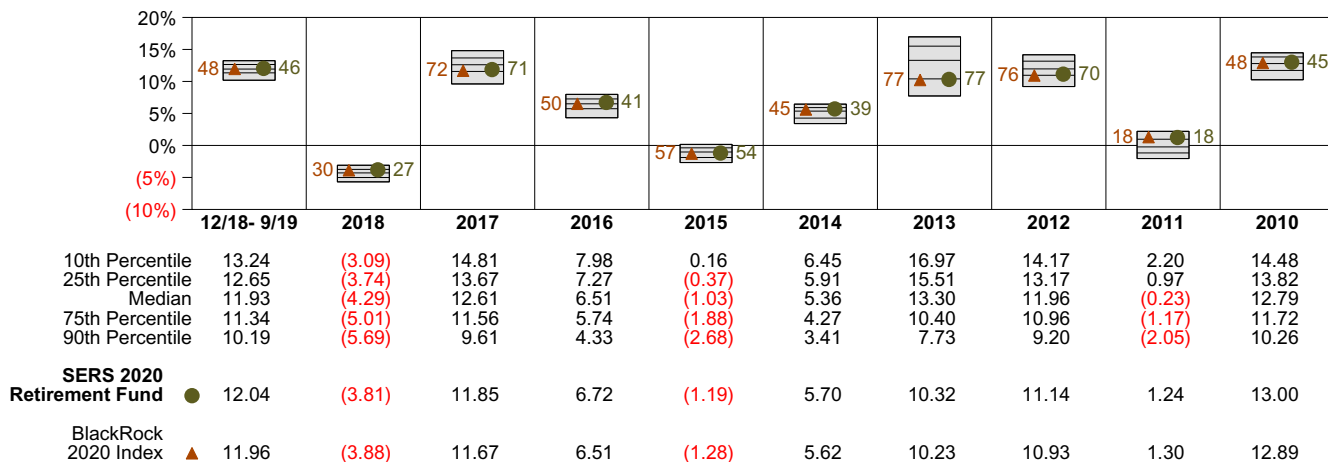


SERS 2020 Retirement Fund Return Analysis Summary

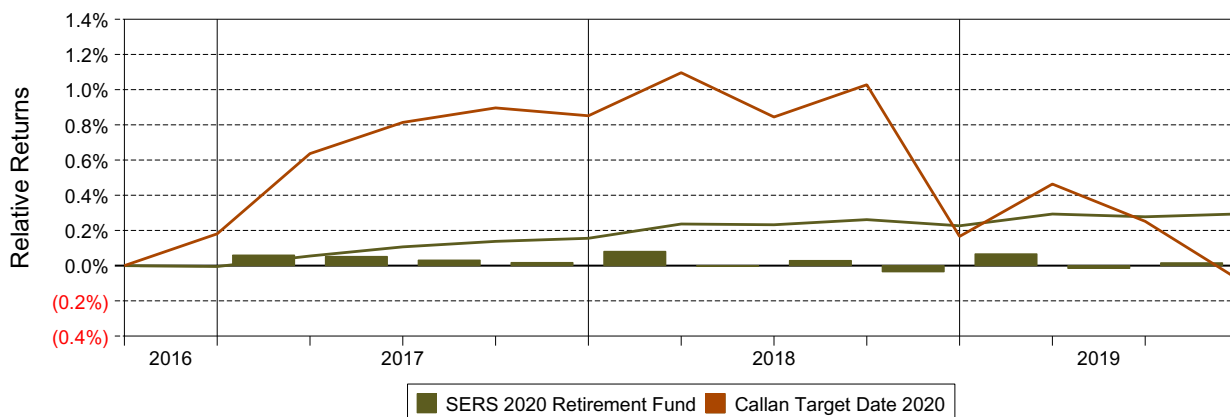
Return Analysis

The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate market benchmark. The last chart illustrates the manager's ranking relative to their style using various risk-adjusted return measures.

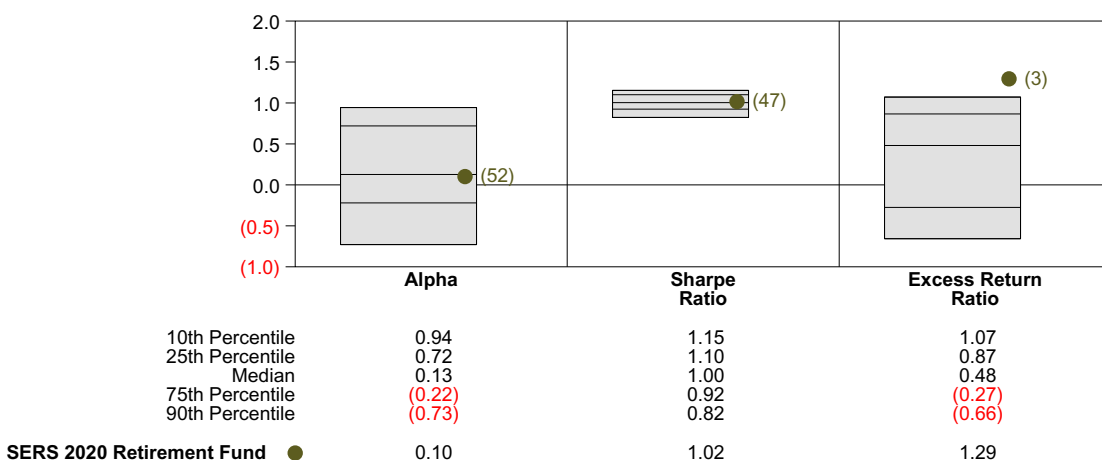
Performance vs Callan Target Date 2020 (Net)



Cumulative and Quarterly Relative Return vs BlackRock 2020 Index



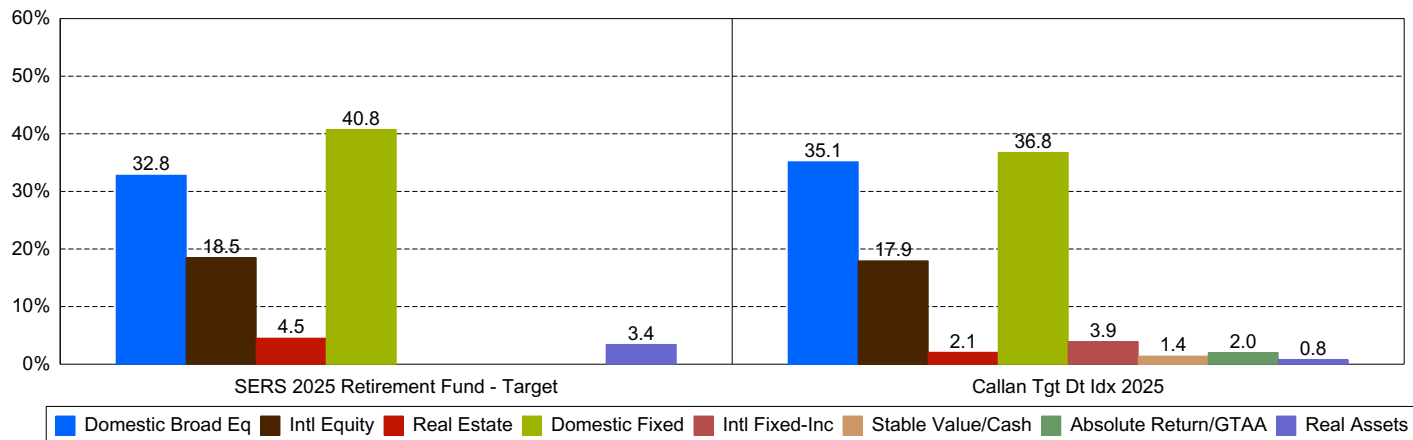
Risk Adjusted Return Measures vs BlackRock 2020 Index Rankings Against Callan Target Date 2020 (Net) Seven Years Ended September 30, 2019



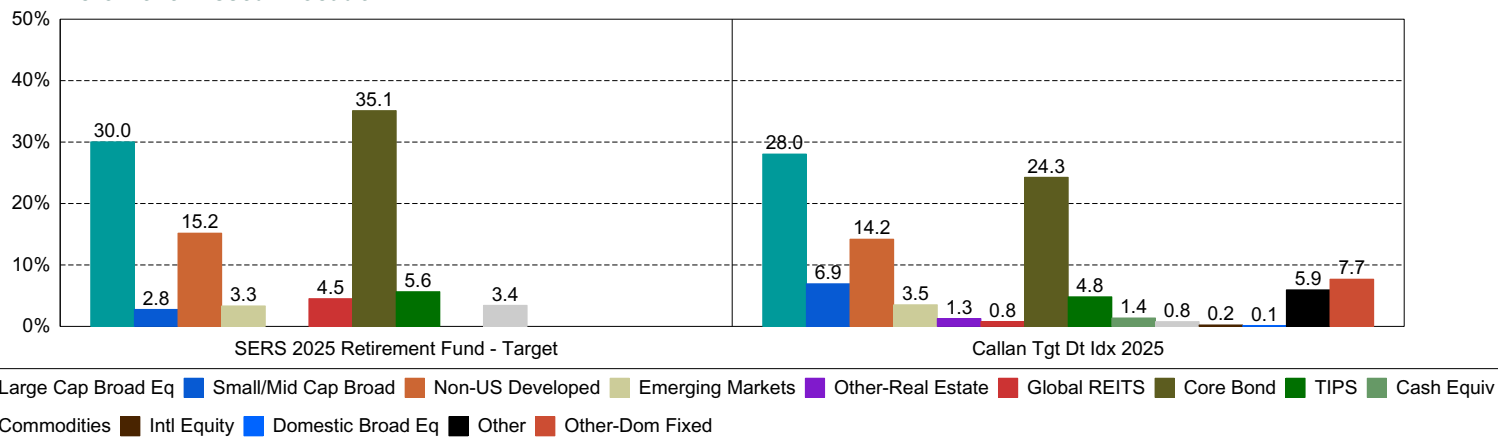
SERS 2025 Retirement Fund Target Date Fund Asset Allocation as of September 30, 2019

The charts below illustrate the current target asset allocation of the relevant target date fund based on its underlying glide path and compares it to an index. The top charts compare target asset allocation at a high "macro" asset class level, while the middle charts show a more detailed "micro" level view. The bottom chart compares the current "macro" level target asset allocation, and index, to a relevant peer group of target date funds by ranking the various target asset class weights versus those peer target date funds.

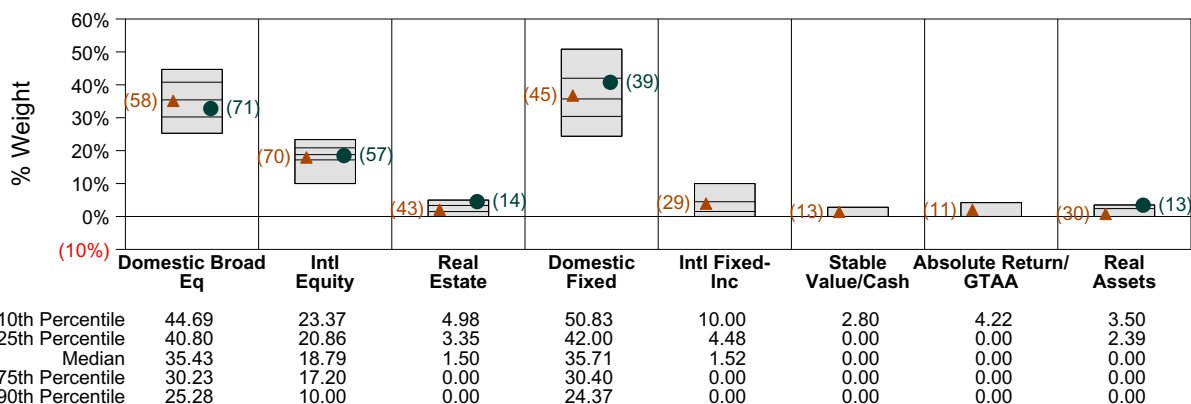
Macro-Level Asset Allocation



Micro-Level Asset Allocation



Macro Asset Allocation Rankings vs. Callan Target Date 2025



SERS 2025 Retirement Fund - Target

●	32.80	18.50	4.51	40.76	-	-	-	3.42
▲	35.13	17.95	2.07	36.76	3.93	1.40	1.99	0.78

SERS 2025 Retirement Fund Period Ended September 30, 2019

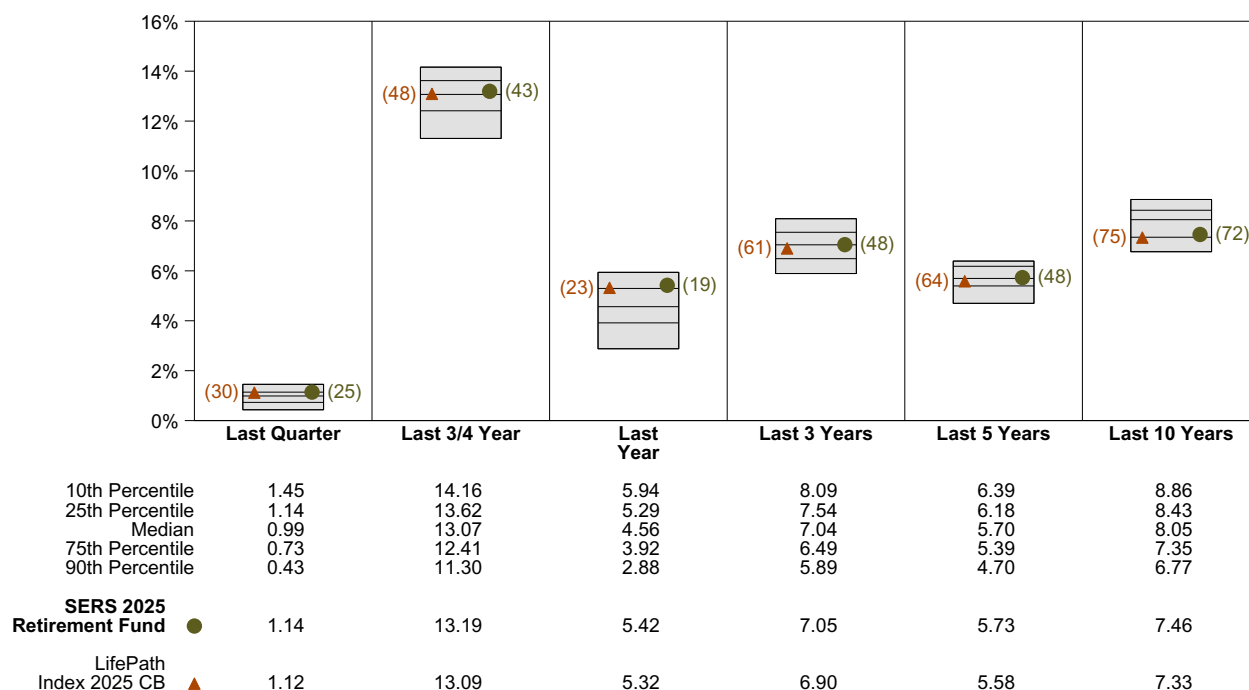
Investment Philosophy

The BlackRock LifePath(R) Index 2025 Fund (the "Fund") seeks to provide for retirement outcomes consistent with investor preferences throughout the savings and drawdown phase based on quantitatively measured risk that investors, on average, may be willing to accept. The Fund will be diversified across global asset classes, with allocations changing over the investment horizon to become more heavily oriented toward debt and debt-like securities, on the premise that individuals investing for retirement desire to reduce investment risk in their retirement accounts as their retirement date approaches.

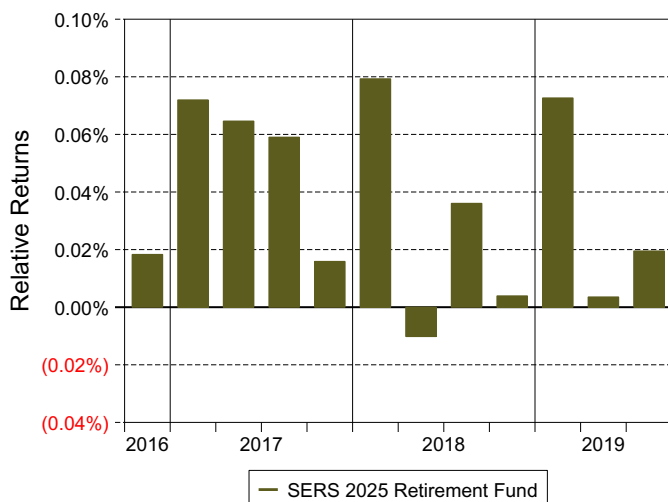
Quarterly Summary and Highlights

- SERS 2025 Retirement Fund's portfolio posted a 1.14% return for the quarter placing it in the 25 percentile of the Callan Target Date 2025 group for the quarter and in the 19 percentile for the last year.
- SERS 2025 Retirement Fund's portfolio outperformed the LifePath Index 2025 CB by 0.02% for the quarter and outperformed the LifePath Index 2025 CB for the year by 0.10%.

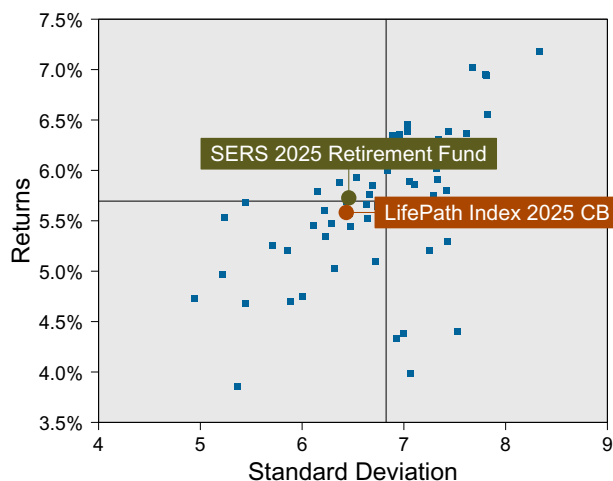
Performance vs Callan Target Date 2025 (Net)



Relative Return vs LifePath Index 2025 CB



Callan Target Date 2025 (Net) Annualized Five Year Risk vs Return

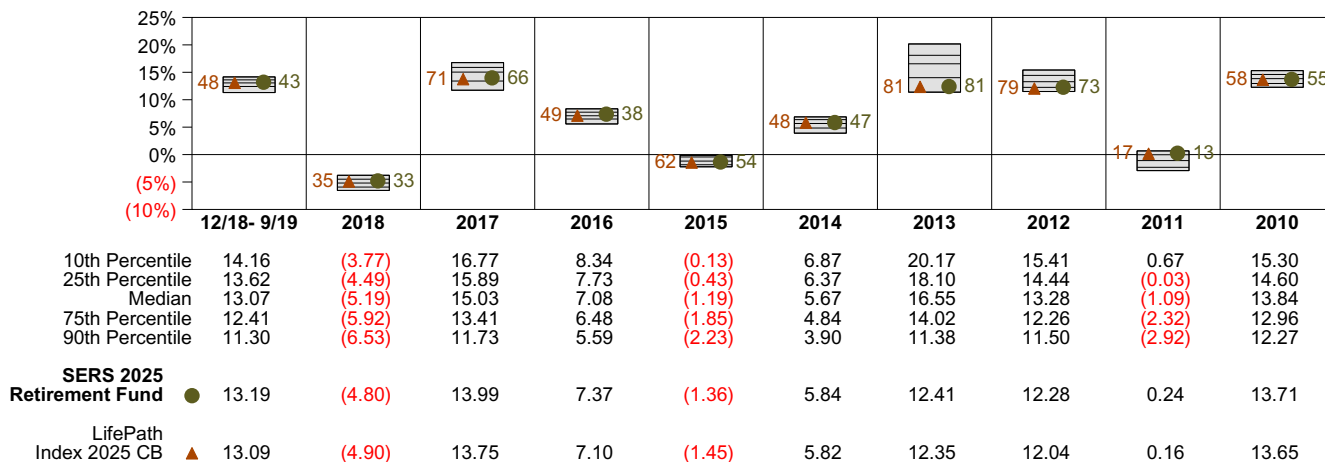


SERS 2025 Retirement Fund Return Analysis Summary

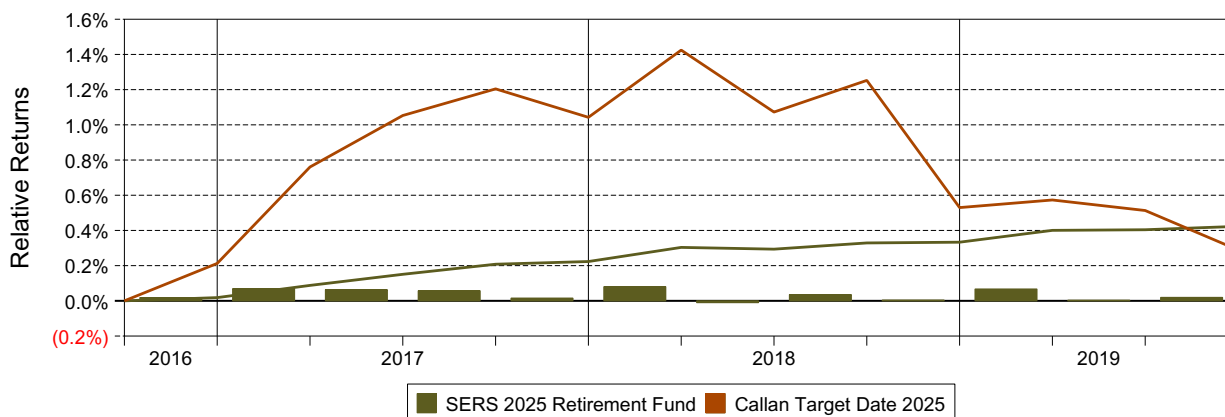
Return Analysis

The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate market benchmark. The last chart illustrates the manager's ranking relative to their style using various risk-adjusted return measures.

Performance vs Callan Target Date 2025 (Net)



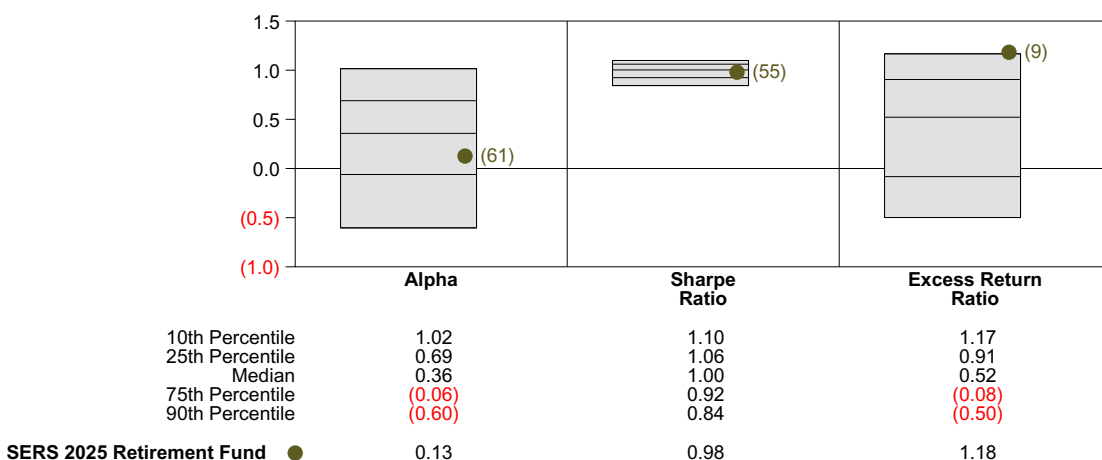
Cumulative and Quarterly Relative Return vs LifePath Index 2025 CB



Risk Adjusted Return Measures vs LifePath Index 2025 CB

Rankings Against Callan Target Date 2025 (Net)

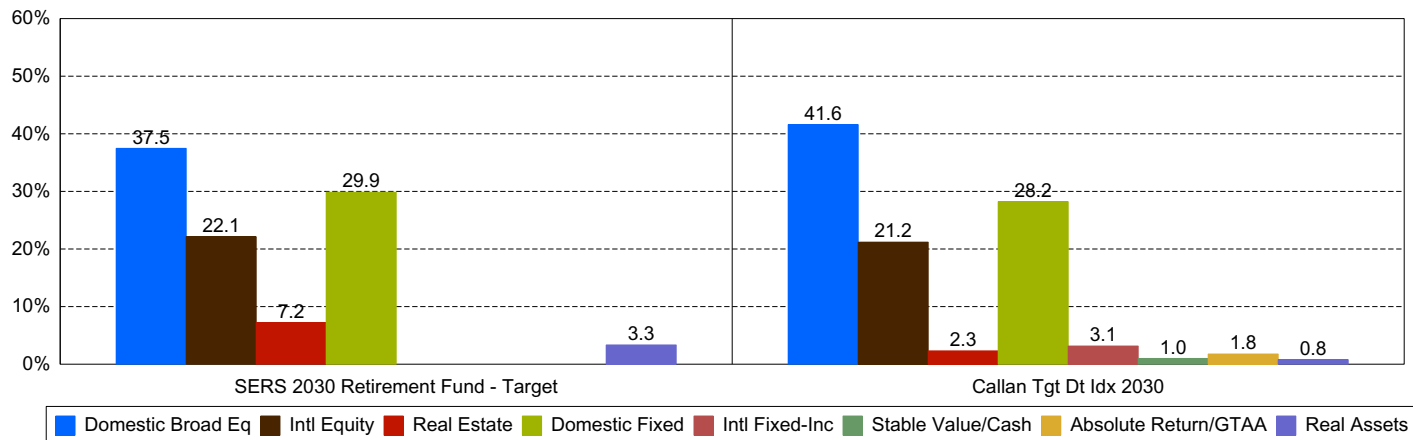
Seven Years Ended September 30, 2019



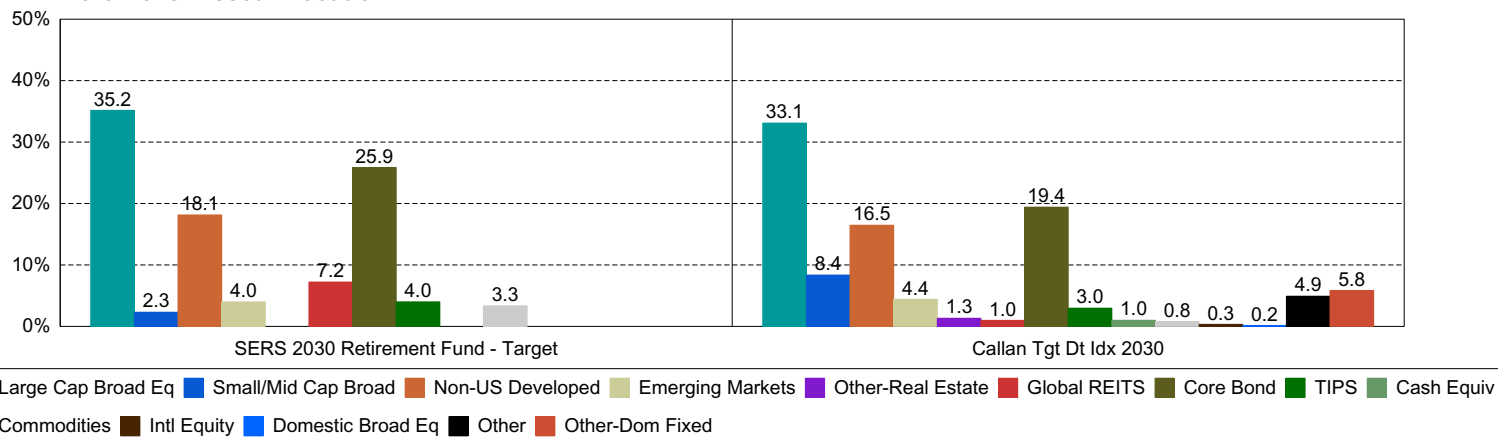
SERS 2030 Retirement Fund Target Date Fund Asset Allocation as of September 30, 2019

The charts below illustrate the current target asset allocation of the relevant target date fund based on its underlying glide path and compares it to an index. The top charts compare target asset allocation at a high "macro" asset class level, while the middle charts show a more detailed "micro" level view. The bottom chart compares the current "macro" level target asset allocation, and index, to a relevant peer group of target date funds by ranking the various target asset class weights versus those peer target date funds.

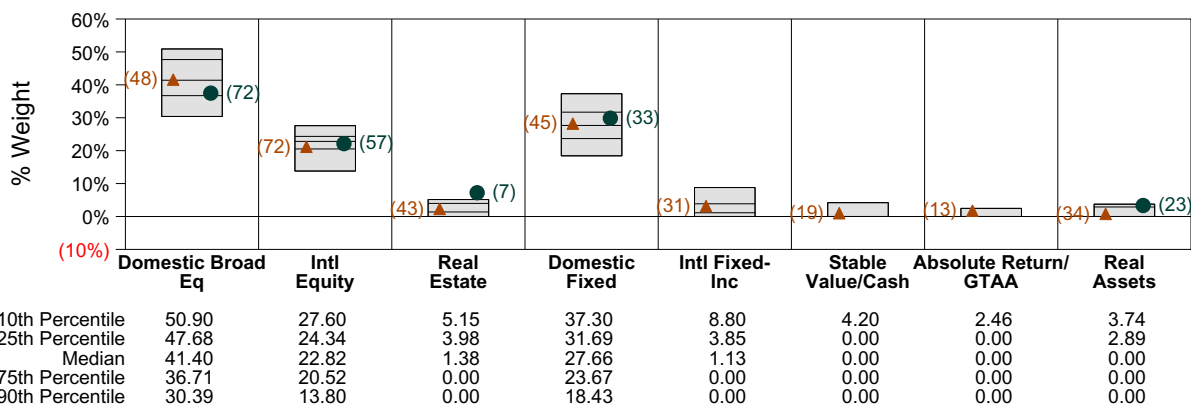
Macro-Level Asset Allocation



Micro-Level Asset Allocation



Macro Asset Allocation Rankings vs. Callan Target Date 2030



SERS 2030 Retirement Fund - Target	●	37.47	22.12	7.22	29.85	-	-	-	3.34
Callan Tgt Dt Idx 2030	▲	41.59	21.18	2.31	28.22	3.15	1.00	1.76	0.79

SERS 2030 Retirement Fund Period Ended September 30, 2019

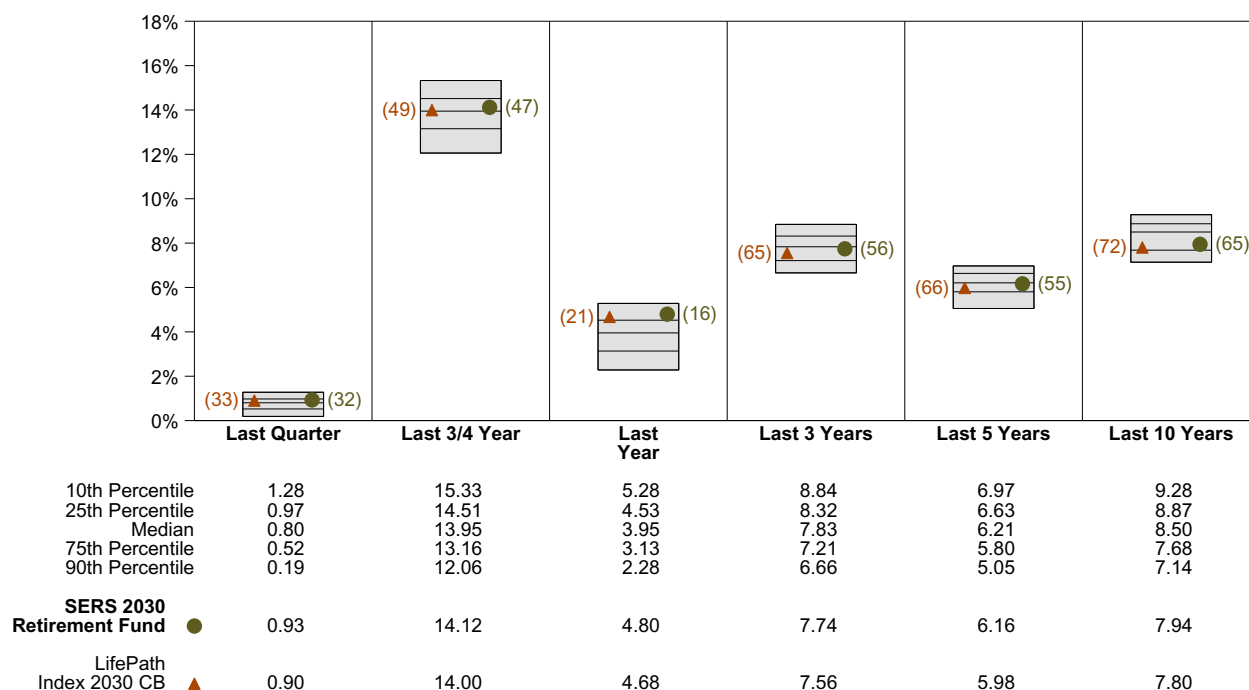
Investment Philosophy

The BlackRock LifePath(R) Index 2030 Fund (the "Fund") seeks to provide for retirement outcomes consistent with investor preferences throughout the savings and drawdown phase based on quantitatively measured risk that investors, on average, may be willing to accept. The Fund will be diversified across global asset classes, with allocations changing over the investment horizon to become more heavily oriented toward debt and debt-like securities, on the premise that individuals investing for retirement desire to reduce investment risk in their retirement accounts as their retirement date approaches.

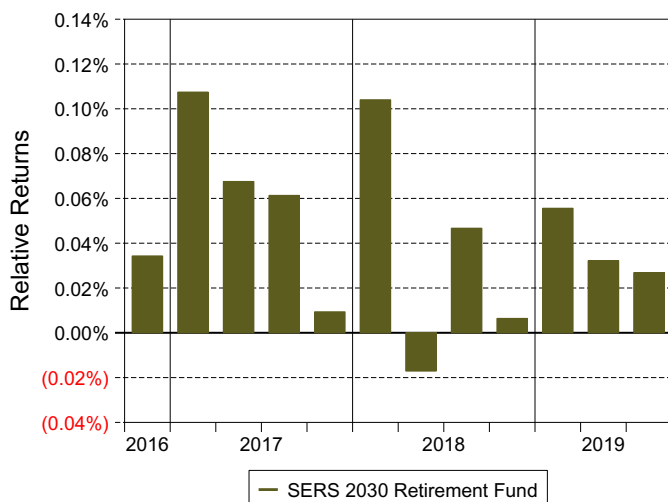
Quarterly Summary and Highlights

- SERS 2030 Retirement Fund's portfolio posted a 0.93% return for the quarter placing it in the 32 percentile of the Callan Target Date 2030 group for the quarter and in the 16 percentile for the last year.
- SERS 2030 Retirement Fund's portfolio outperformed the LifePath Index 2030 CB by 0.03% for the quarter and outperformed the LifePath Index 2030 CB for the year by 0.12%.

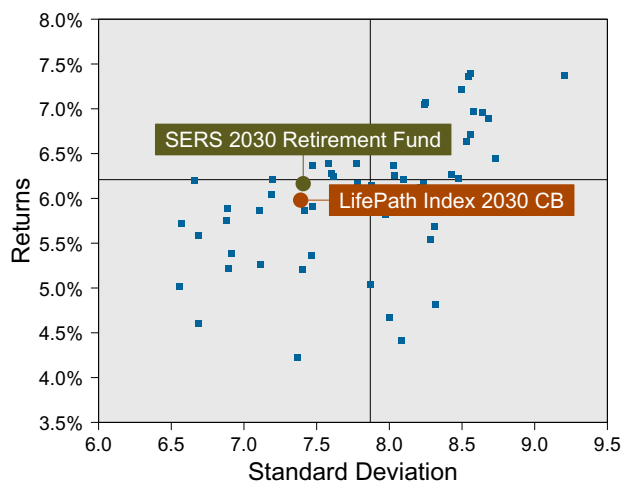
Performance vs Callan Target Date 2030 (Net)



Relative Return vs LifePath Index 2030 CB



Callan Target Date 2030 (Net) Annualized Five Year Risk vs Return

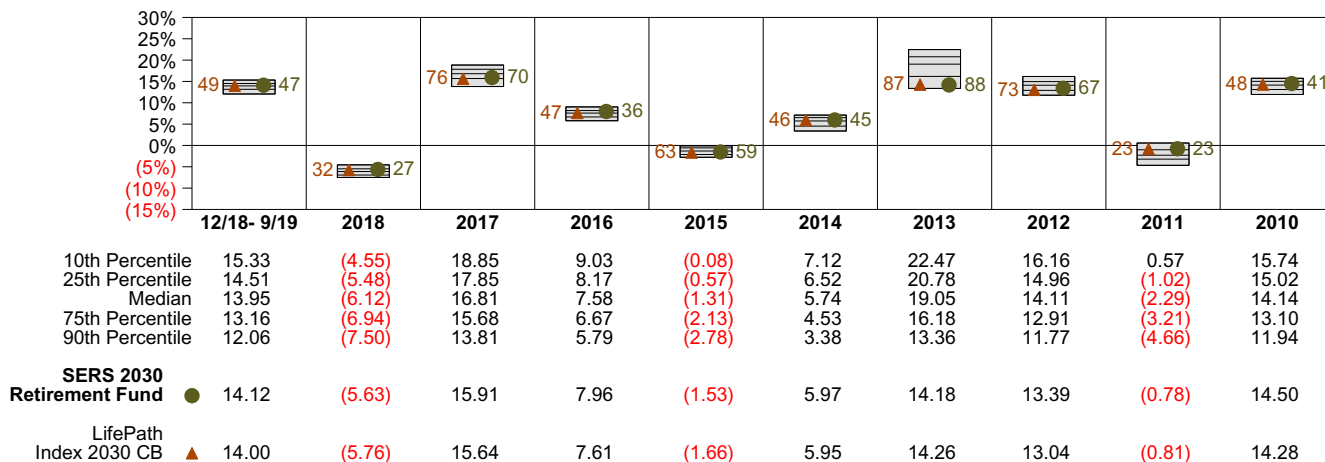


SERS 2030 Retirement Fund Return Analysis Summary

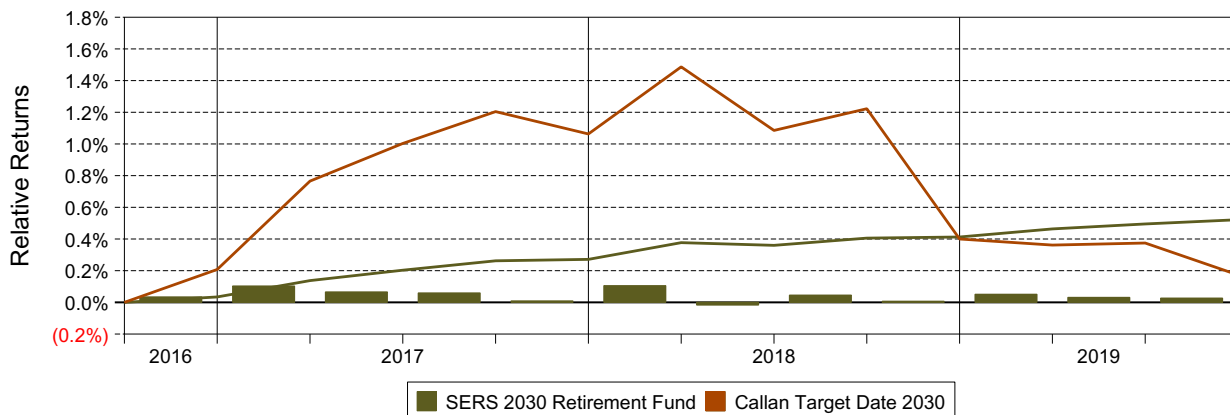
Return Analysis

The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate market benchmark. The last chart illustrates the manager's ranking relative to their style using various risk-adjusted return measures.

Performance vs Callan Target Date 2030 (Net)



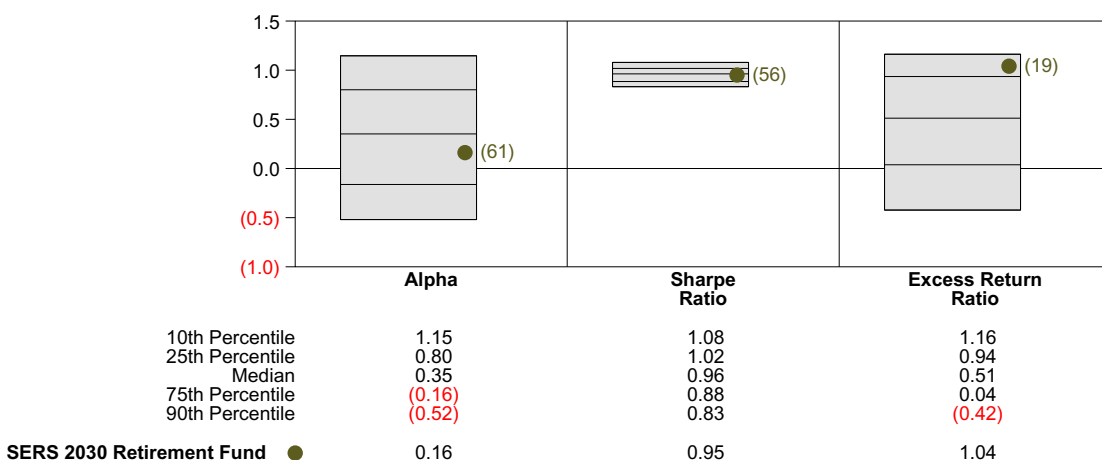
Cumulative and Quarterly Relative Return vs LifePath Index 2030 CB



Risk Adjusted Return Measures vs LifePath Index 2030 CB

Rankings Against Callan Target Date 2030 (Net)

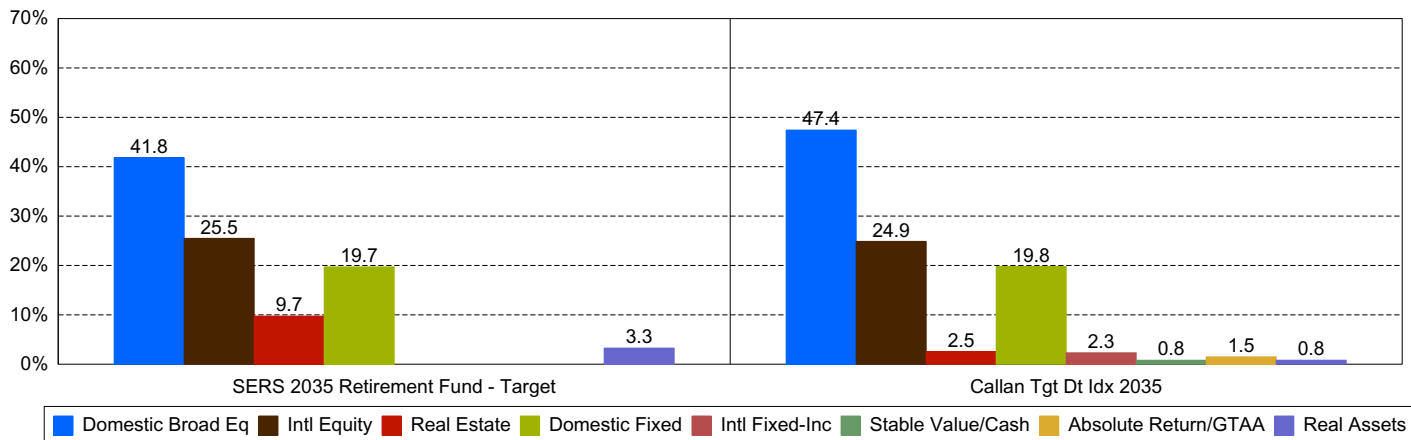
Seven Years Ended September 30, 2019



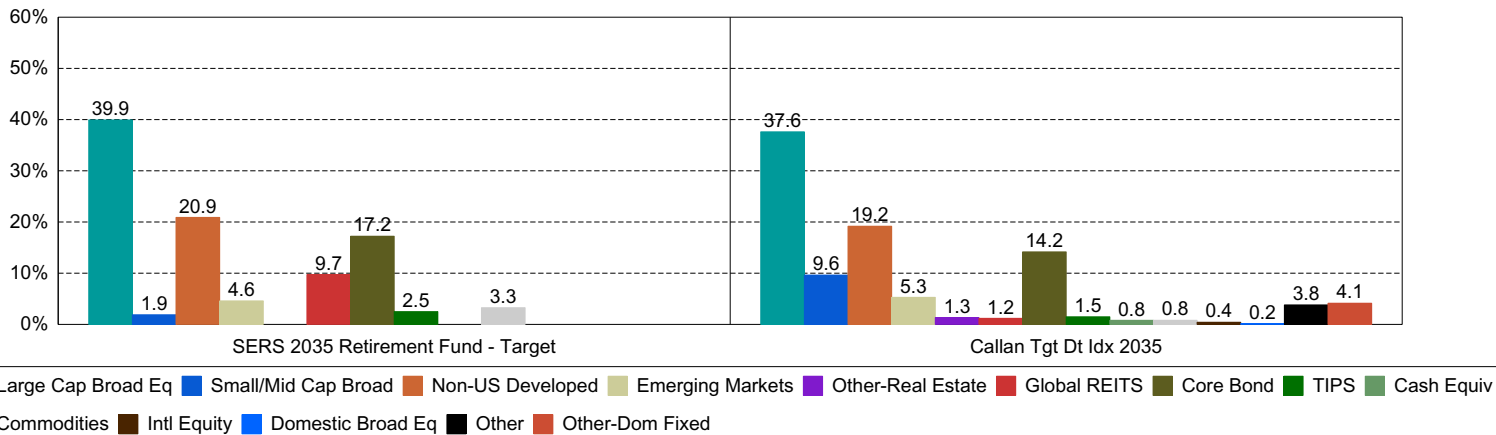
SERS 2035 Retirement Fund Target Date Fund Asset Allocation as of September 30, 2019

The charts below illustrate the current target asset allocation of the relevant target date fund based on its underlying glide path and compares it to an index. The top charts compare target asset allocation at a high "macro" asset class level, while the middle charts show a more detailed "micro" level view. The bottom chart compares the current "macro" level target asset allocation, and index, to a relevant peer group of target date funds by ranking the various target asset class weights versus those peer target date funds.

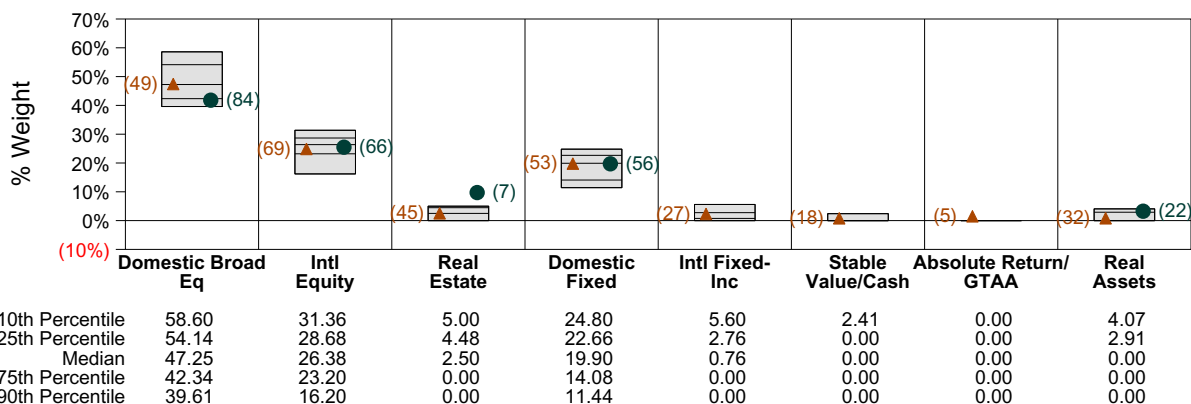
Macro-Level Asset Allocation



Micro-Level Asset Allocation



Macro Asset Allocation Rankings vs. Callan Target Date 2035



SERS 2035 Retirement Fund - Target	●	41.81	25.48	9.74	19.71	-	-	-	3.26
Callan Tgt Dt Idx 2035	▲	47.41	24.87	2.53	19.78	2.31	0.80	1.49	0.80

SERS 2035 Retirement Fund Period Ended September 30, 2019

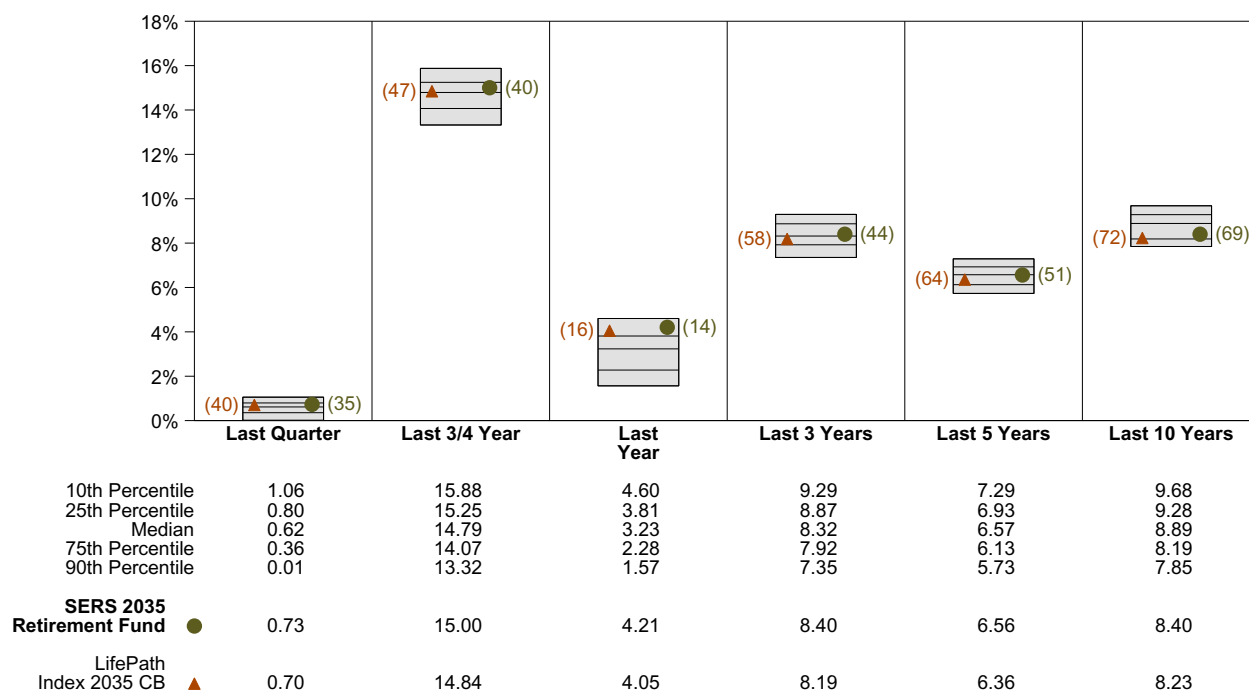
Investment Philosophy

The BlackRock LifePath(R) Index 2035 Fund (the "Fund") seeks to provide for retirement outcomes consistent with investor preferences throughout the savings and drawdown phase based on quantitatively measured risk that investors, on average, may be willing to accept. The Fund will be diversified across global asset classes, with allocations changing over the investment horizon to become more heavily oriented toward debt and debt-like securities, on the premise that individuals investing for retirement desire to reduce investment risk in their retirement accounts as their retirement date approaches.

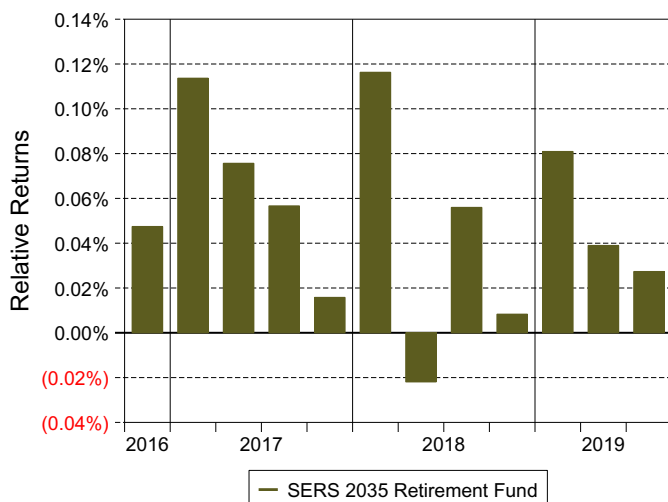
Quarterly Summary and Highlights

- SERS 2035 Retirement Fund's portfolio posted a 0.73% return for the quarter placing it in the 35 percentile of the Callan Target Date 2035 group for the quarter and in the 14 percentile for the last year.
- SERS 2035 Retirement Fund's portfolio outperformed the LifePath Index 2035 CB by 0.03% for the quarter and outperformed the LifePath Index 2035 CB for the year by 0.15%.

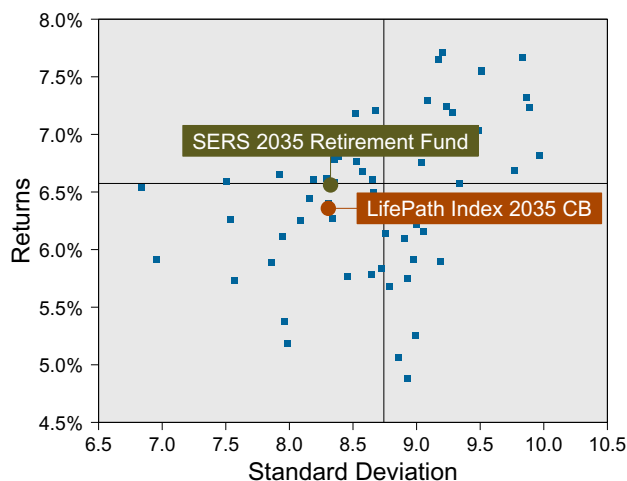
Performance vs Callan Target Date 2035 (Net)



Relative Return vs LifePath Index 2035 CB



Callan Target Date 2035 (Net) Annualized Five Year Risk vs Return

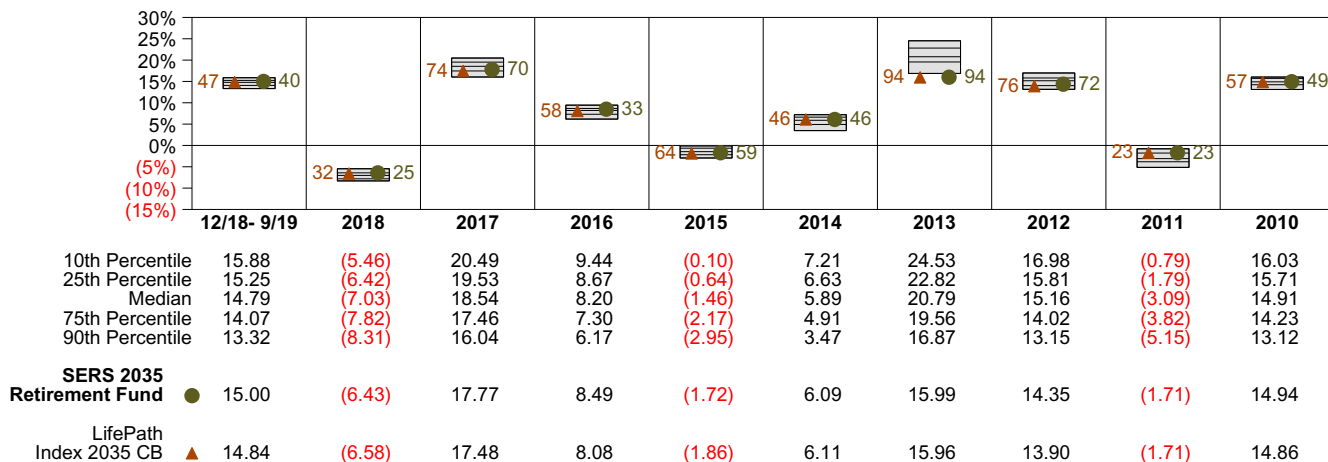


SERS 2035 Retirement Fund Return Analysis Summary

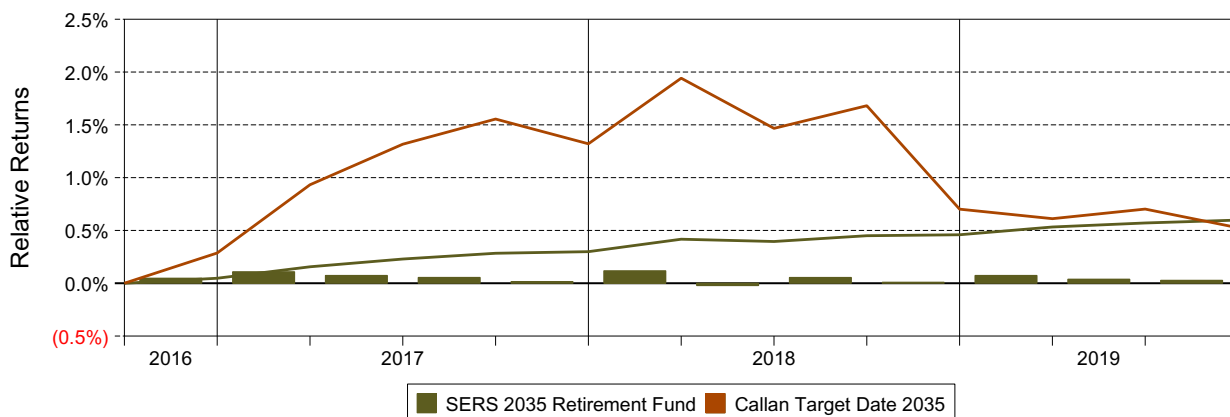
Return Analysis

The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate market benchmark. The last chart illustrates the manager's ranking relative to their style using various risk-adjusted return measures.

Performance vs Callan Target Date 2035 (Net)



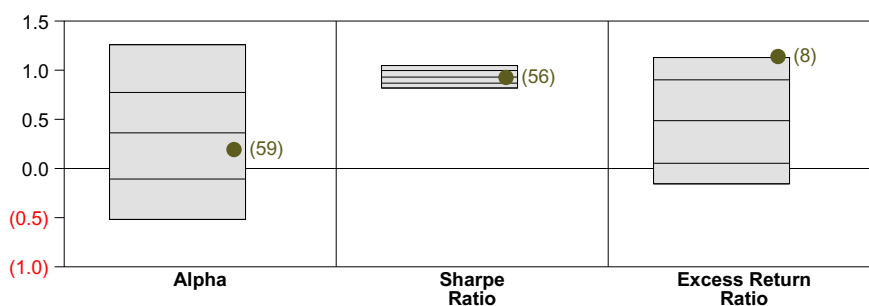
Cumulative and Quarterly Relative Return vs LifePath Index 2035 CB



Risk Adjusted Return Measures vs LifePath Index 2035 CB

Rankings Against Callan Target Date 2035 (Net)

Seven Years Ended September 30, 2019

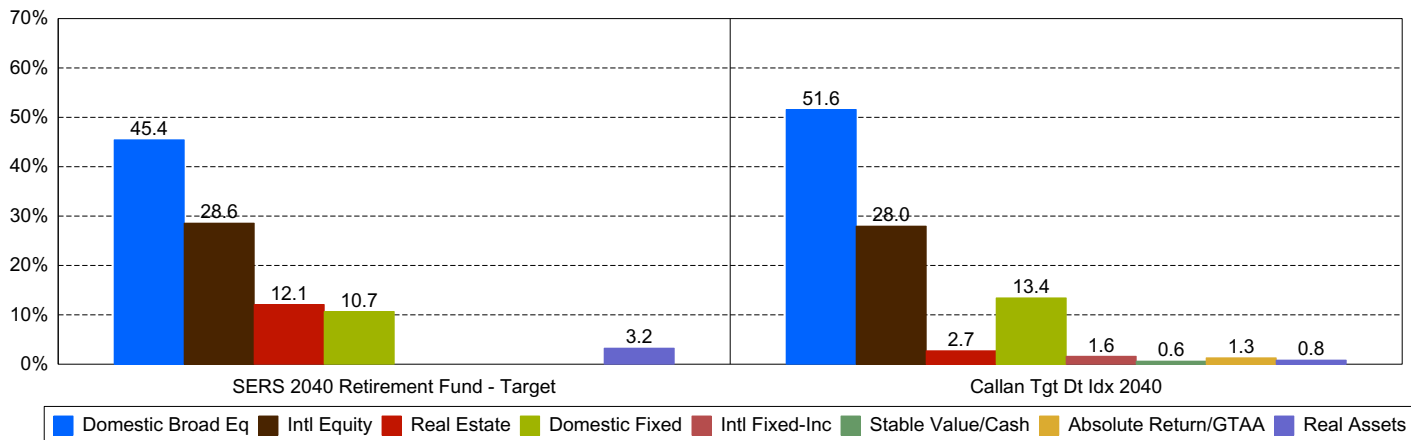


10th Percentile	1.26	1.05	1.13
25th Percentile	0.77	1.00	0.90
Median	0.36	0.93	0.49
75th Percentile	(0.11)	0.87	0.05
90th Percentile	(0.52)	0.82	(0.16)
SERS 2035 Retirement Fund	0.19	0.93	1.14

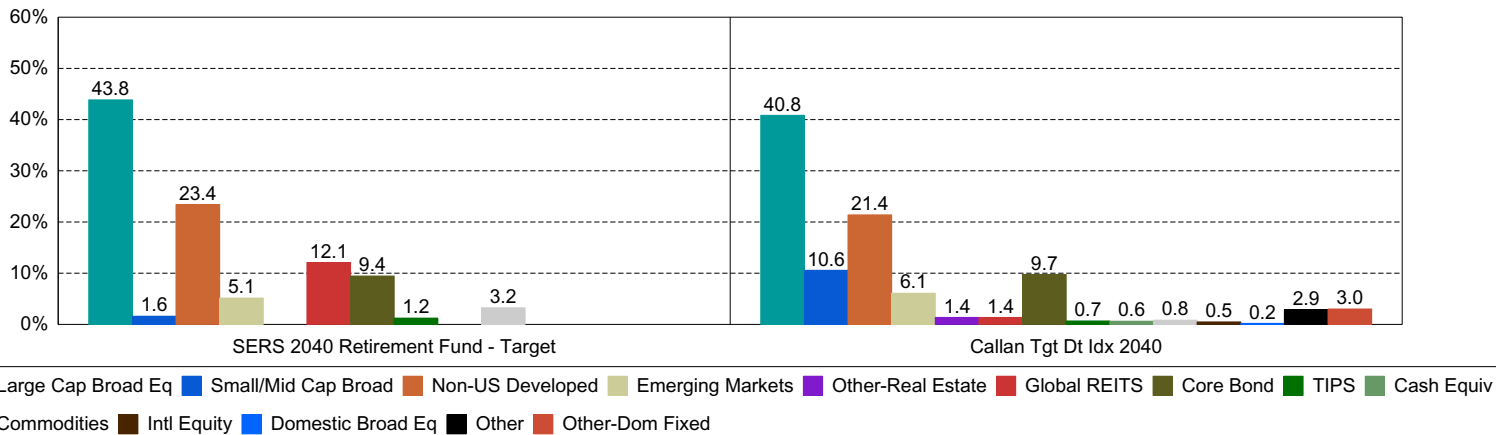
SERS 2040 Retirement Fund Target Date Fund Asset Allocation as of September 30, 2019

The charts below illustrate the current target asset allocation of the relevant target date fund based on its underlying glide path and compares it to an index. The top charts compare target asset allocation at a high "macro" asset class level, while the middle charts show a more detailed "micro" level view. The bottom chart compares the current "macro" level target asset allocation, and index, to a relevant peer group of target date funds by ranking the various target asset class weights versus those peer target date funds.

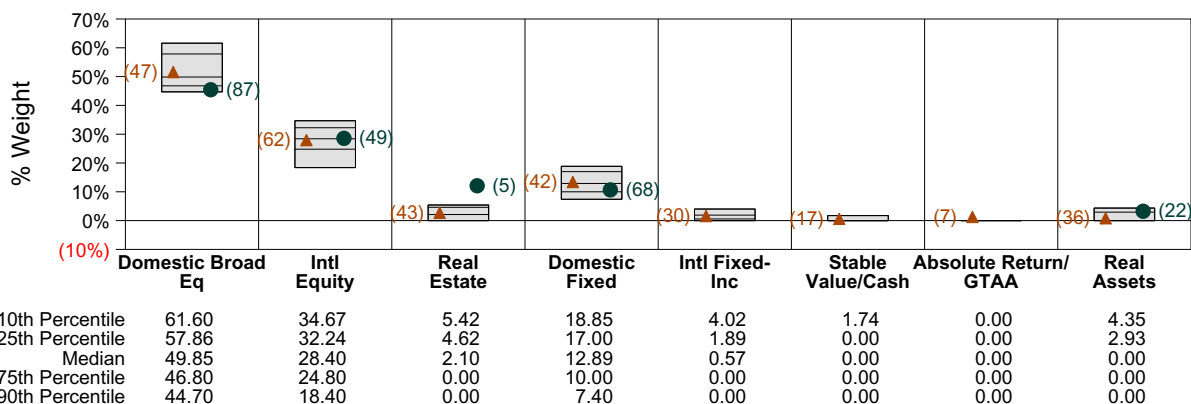
Macro-Level Asset Allocation



Micro-Level Asset Allocation



Macro Asset Allocation Rankings vs. Callan Target Date 2040



SERS 2040 Retirement Fund - Target	●	45.44	28.56	12.09	10.67	-	-	-	3.24
Callan Tgt Dt Idx 2040	▲	51.59	27.95	2.71	13.42	1.60	0.62	1.29	0.82

SERS 2040 Retirement Fund Period Ended September 30, 2019

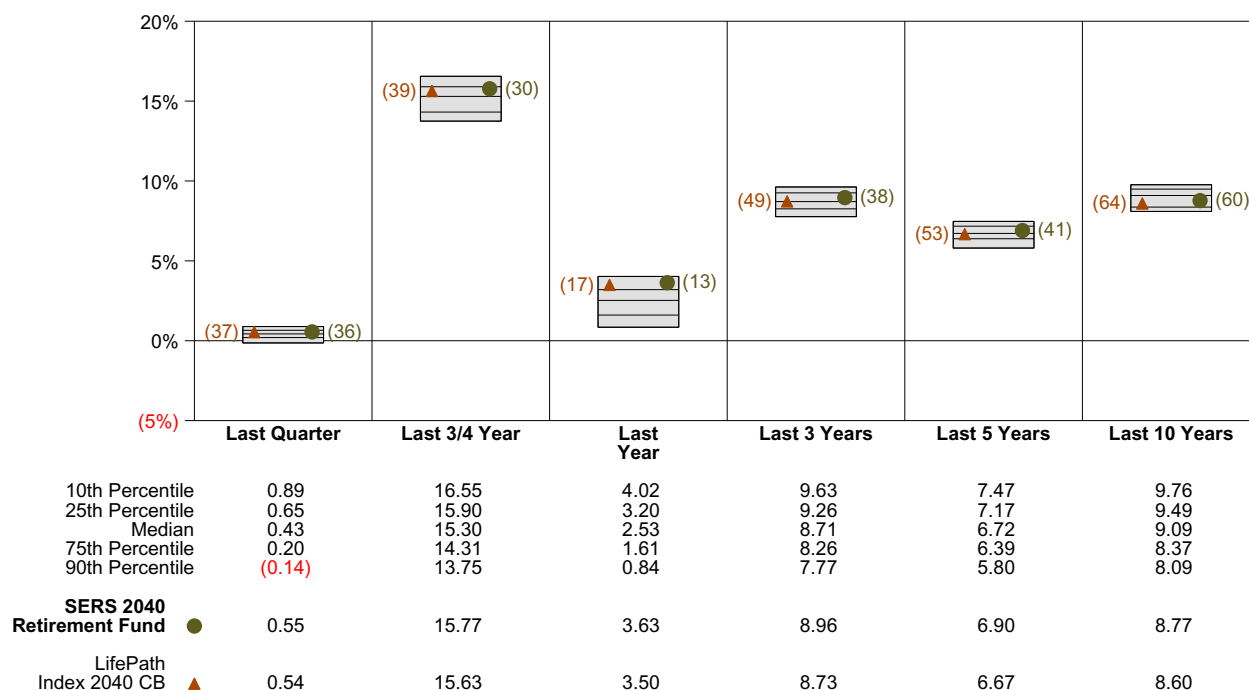
Investment Philosophy

The BlackRock LifePath(R) Index 2040 Fund (the "Fund") seeks to provide for retirement outcomes consistent with investor preferences throughout the savings and drawdown phase based on quantitatively measured risk that investors, on average, may be willing to accept. The Fund will be diversified across global asset classes, with allocations changing over the investment horizon to become more heavily oriented toward debt and debt-like securities, on the premise that individuals investing for retirement desire to reduce investment risk in their retirement accounts as their retirement date approaches.

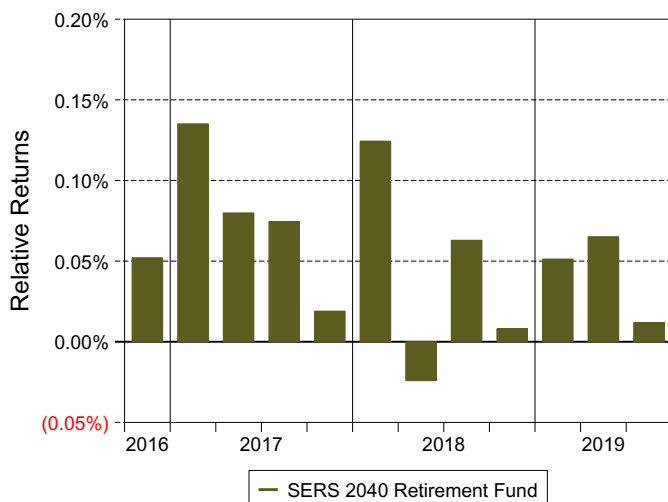
Quarterly Summary and Highlights

- SERS 2040 Retirement Fund's portfolio posted a 0.55% return for the quarter placing it in the 36 percentile of the Callan Target Date 2040 group for the quarter and in the 13 percentile for the last year.
- SERS 2040 Retirement Fund's portfolio outperformed the LifePath Index 2040 CB by 0.01% for the quarter and outperformed the LifePath Index 2040 CB for the year by 0.13%.

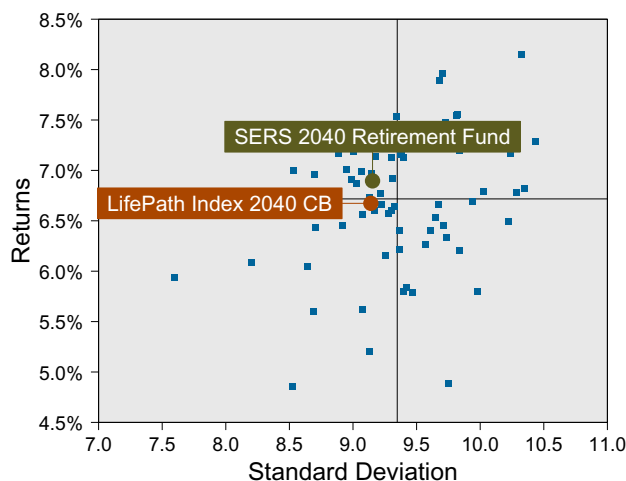
Performance vs Callan Target Date 2040 (Net)



Relative Return vs LifePath Index 2040 CB



Callan Target Date 2040 (Net) Annualized Five Year Risk vs Return

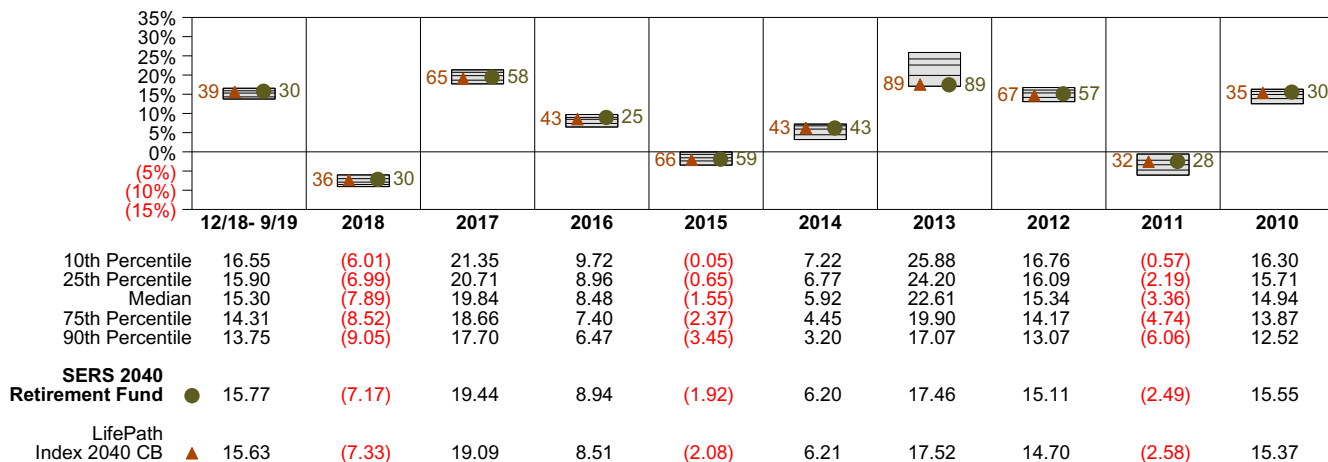


SERS 2040 Retirement Fund Return Analysis Summary

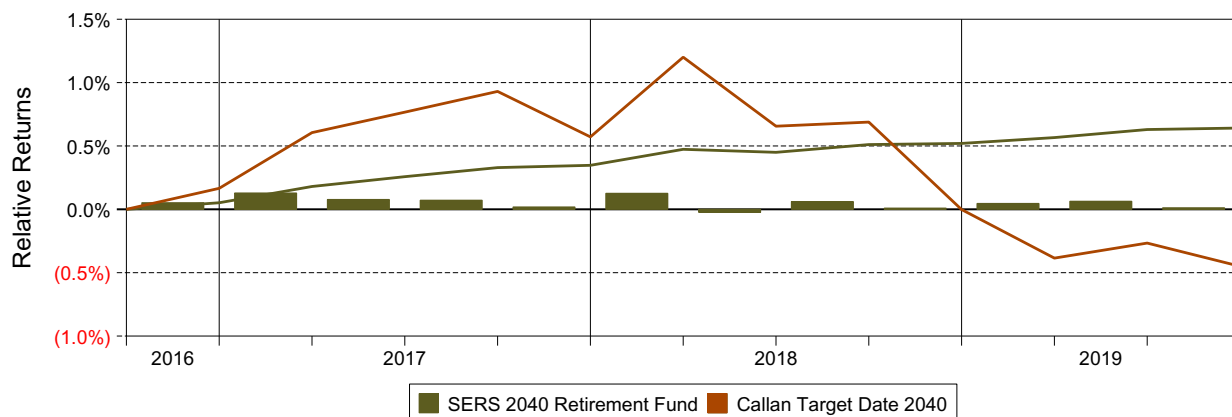
Return Analysis

The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate market benchmark. The last chart illustrates the manager's ranking relative to their style using various risk-adjusted return measures.

Performance vs Callan Target Date 2040 (Net)



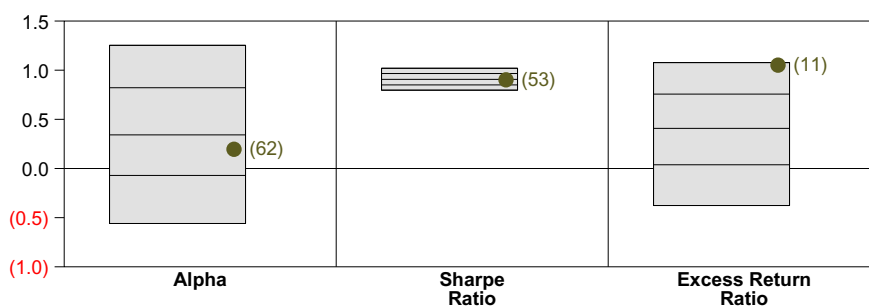
Cumulative and Quarterly Relative Return vs LifePath Index 2040 CB



Risk Adjusted Return Measures vs LifePath Index 2040 CB

Rankings Against Callan Target Date 2040 (Net)

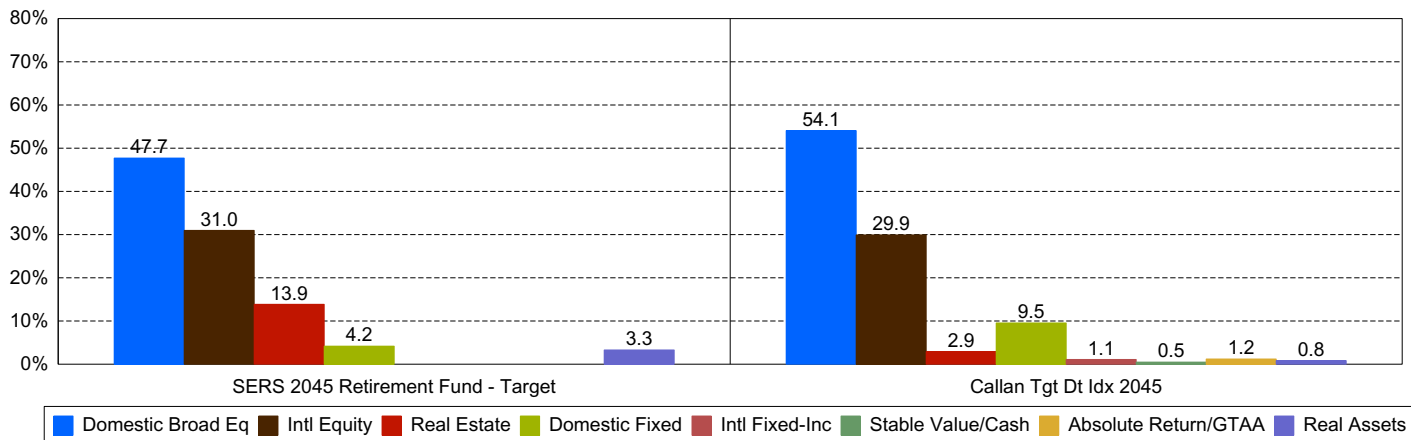
Seven Years Ended September 30, 2019



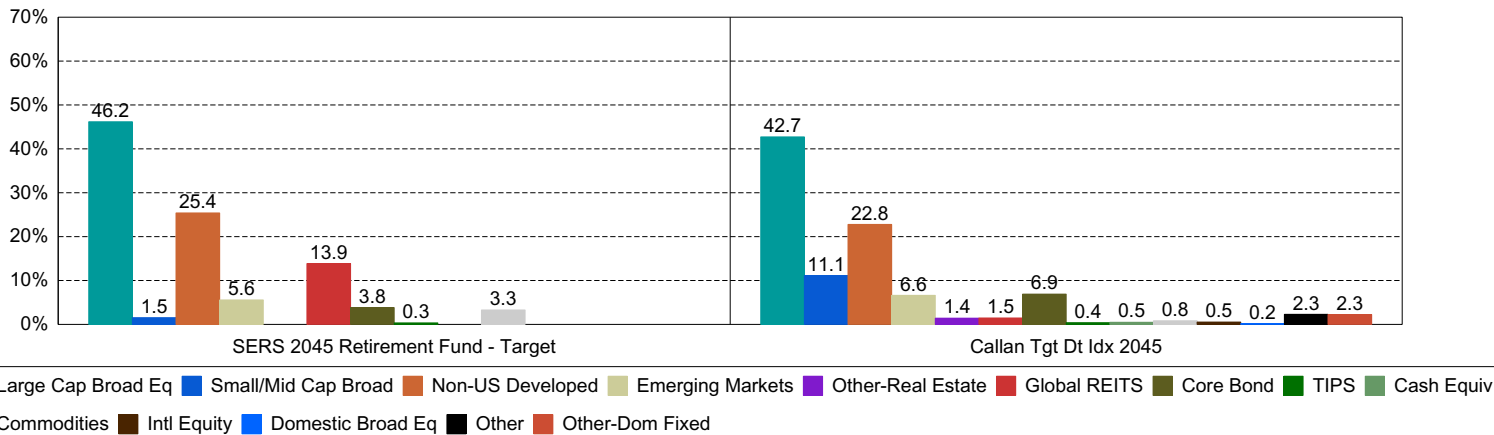
SERS 2045 Retirement Fund Target Date Fund Asset Allocation as of September 30, 2019

The charts below illustrate the current target asset allocation of the relevant target date fund based on its underlying glide path and compares it to an index. The top charts compare target asset allocation at a high "macro" asset class level, while the middle charts show a more detailed "micro" level view. The bottom chart compares the current "macro" level target asset allocation, and index, to a relevant peer group of target date funds by ranking the various target asset class weights versus those peer target date funds.

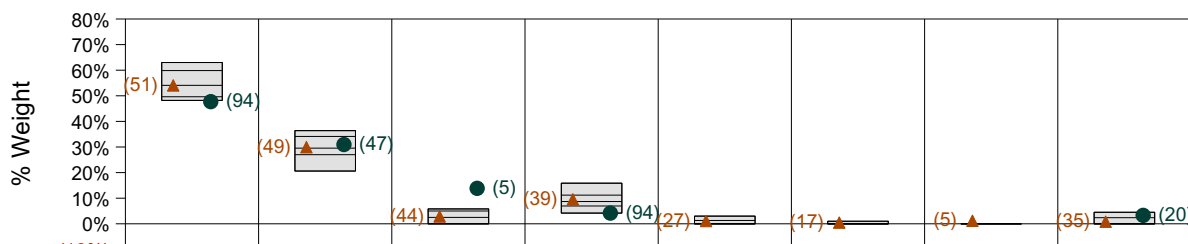
Macro-Level Asset Allocation



Micro-Level Asset Allocation



Macro Asset Allocation Rankings vs. Callan Target Date 2045



SERS 2045 Retirement Fund - Target

●	47.71	30.97	13.86	4.17	-	-	-	3.29
▲	54.06	29.92	2.87	9.54	1.09	0.48	1.20	0.83

SERS 2045 Retirement Fund Period Ended September 30, 2019

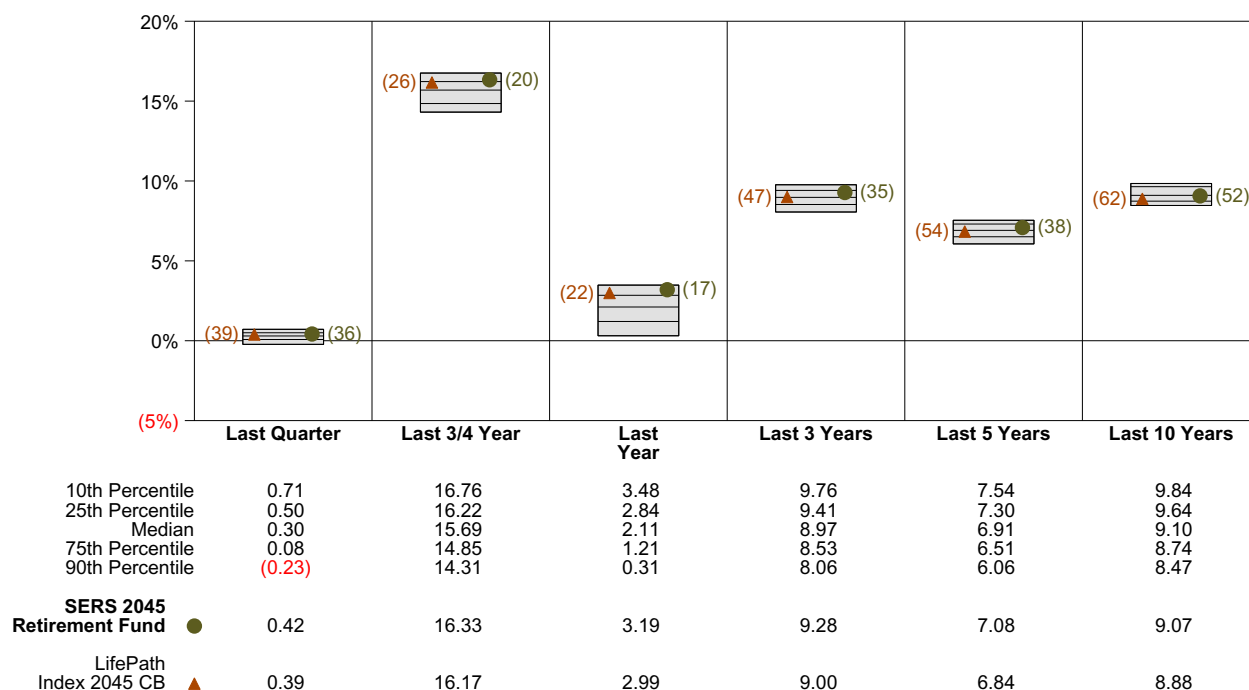
Investment Philosophy

The BlackRock LifePath(R) Index 2045 Fund (the "Fund") seeks to provide for retirement outcomes consistent with investor preferences throughout the savings and drawdown phase based on quantitatively measured risk that investors, on average, may be willing to accept. The Fund will be diversified across global asset classes, with allocations changing over the investment horizon to become more heavily oriented toward debt and debt-like securities, on the premise that individuals investing for retirement desire to reduce investment risk in their retirement accounts as their retirement date approaches.

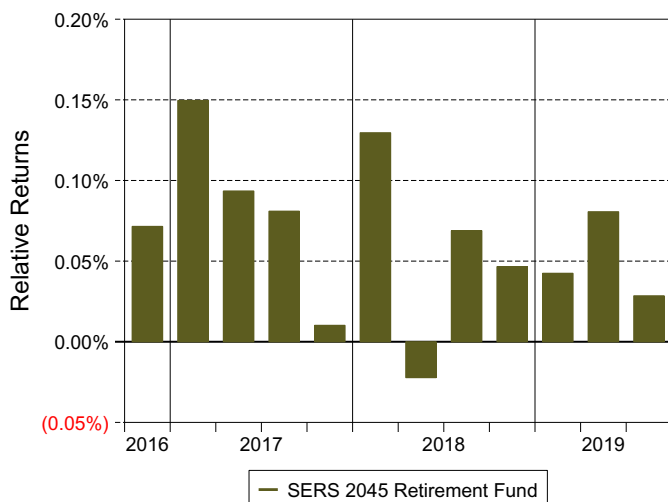
Quarterly Summary and Highlights

- SERS 2045 Retirement Fund's portfolio posted a 0.42% return for the quarter placing it in the 36 percentile of the Callan Target Date 2045 group for the quarter and in the 17 percentile for the last year.
- SERS 2045 Retirement Fund's portfolio outperformed the LifePath Index 2045 CB by 0.03% for the quarter and outperformed the LifePath Index 2045 CB for the year by 0.20%.

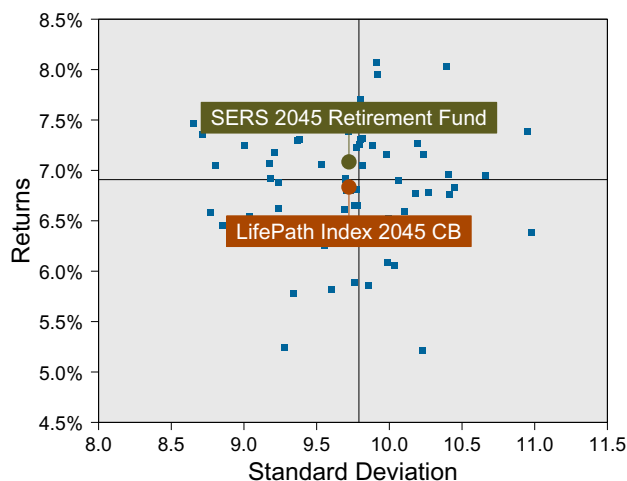
Performance vs Callan Target Date 2045 (Net)



Relative Return vs LifePath Index 2045 CB



Callan Target Date 2045 (Net) Annualized Five Year Risk vs Return

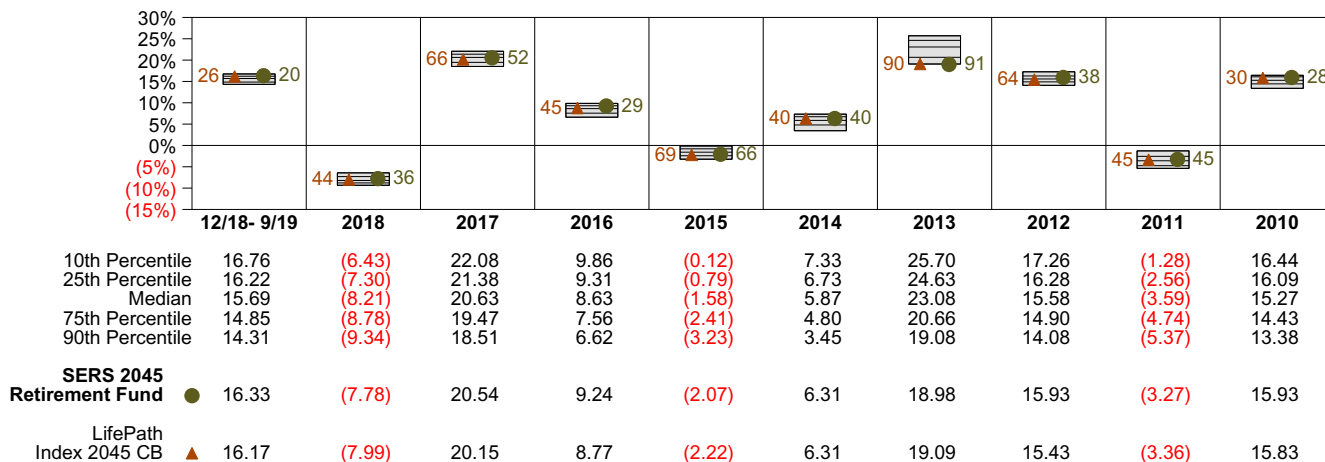


SERS 2045 Retirement Fund Return Analysis Summary

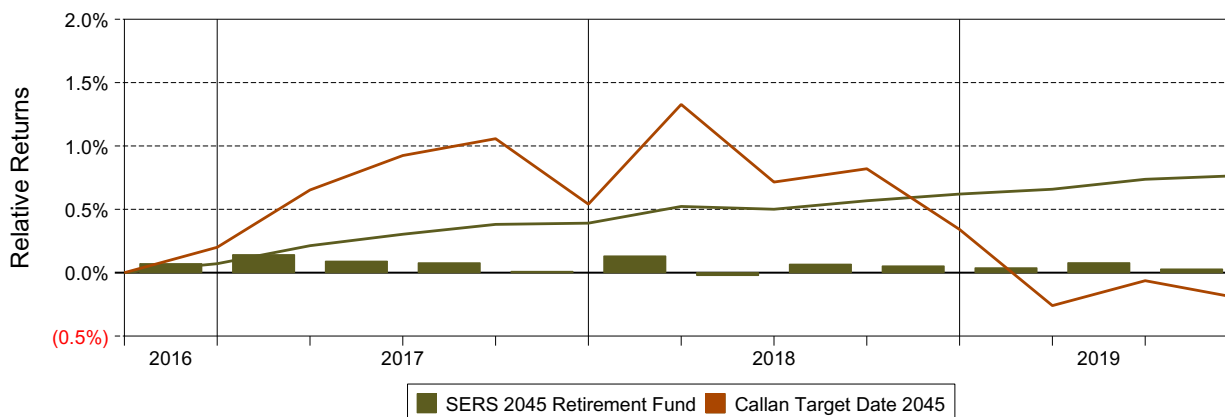
Return Analysis

The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate market benchmark. The last chart illustrates the manager's ranking relative to their style using various risk-adjusted return measures.

Performance vs Callan Target Date 2045 (Net)



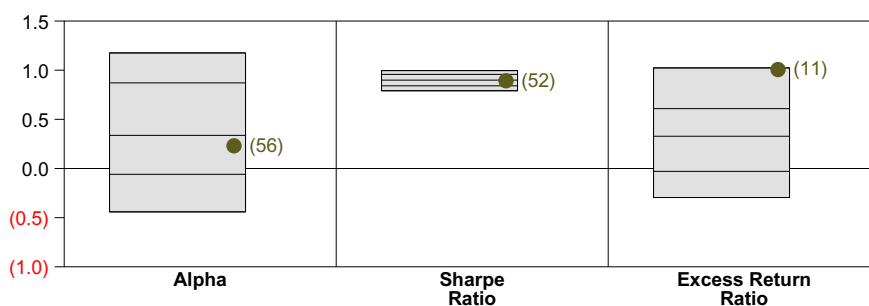
Cumulative and Quarterly Relative Return vs LifePath Index 2045 CB



Risk Adjusted Return Measures vs LifePath Index 2045 CB

Rankings Against Callan Target Date 2045 (Net)

Seven Years Ended September 30, 2019



10th Percentile
25th Percentile
Median
75th Percentile
90th Percentile

1.18
0.87
0.34
(0.06)
(0.44)

1.00
0.96
0.90
0.84
0.79

1.02
0.61
0.33
(0.03)
(0.30)

SERS 2045 Retirement Fund

0.23

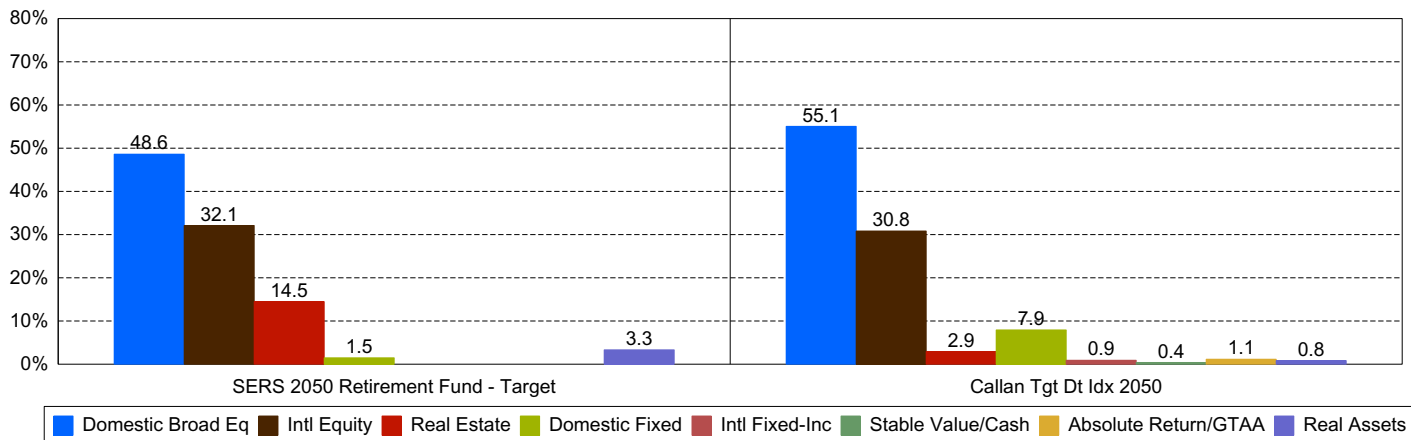
0.89

1.01

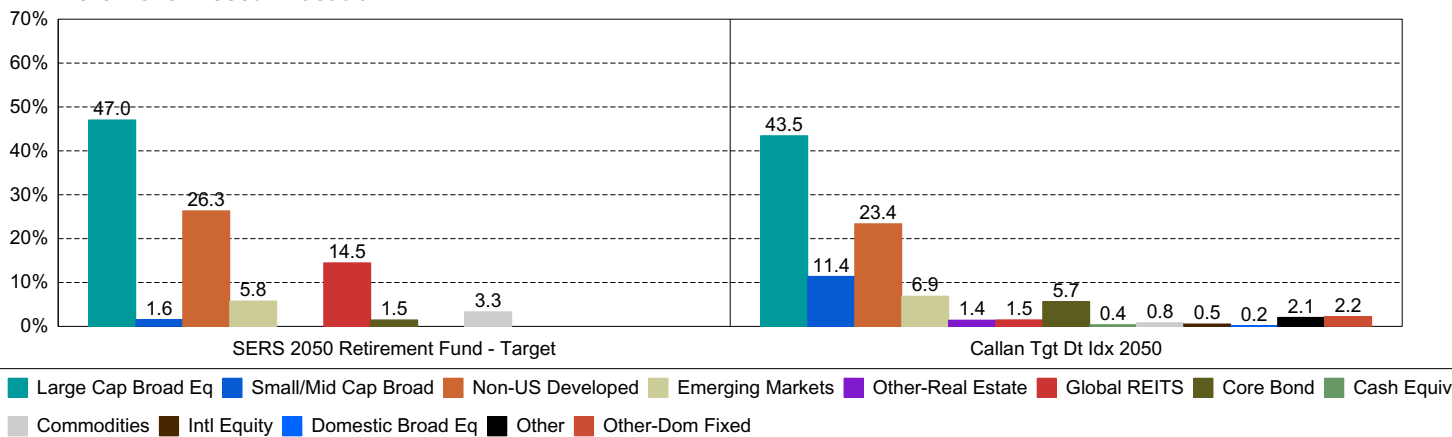
SERS 2050 Retirement Fund Target Date Fund Asset Allocation as of September 30, 2019

The charts below illustrate the current target asset allocation of the relevant target date fund based on its underlying glide path and compares it to an index. The top charts compare target asset allocation at a high "macro" asset class level, while the middle charts show a more detailed "micro" level view. The bottom chart compares the current "macro" level target asset allocation, and index, to a relevant peer group of target date funds by ranking the various target asset class weights versus those peer target date funds.

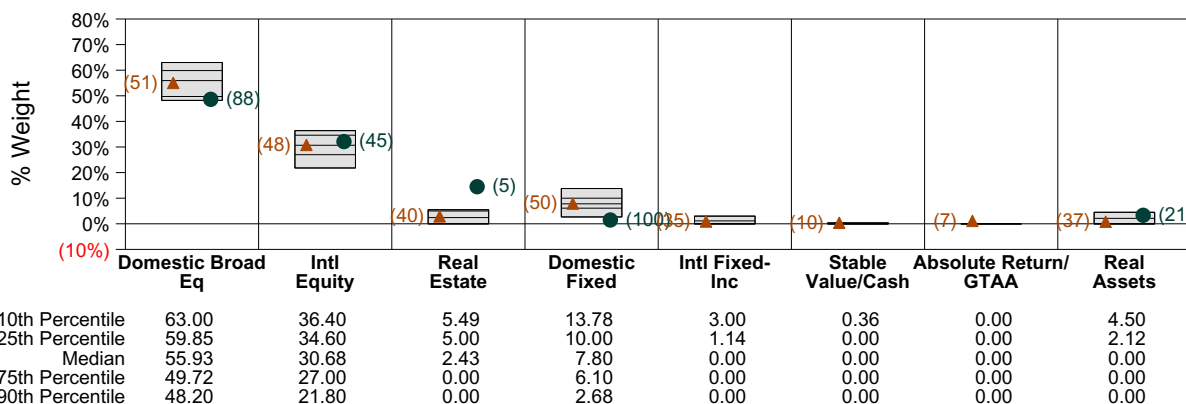
Macro-Level Asset Allocation



Micro-Level Asset Allocation



Macro Asset Allocation Rankings vs. Callan Target Date 2050



SERS 2050 Retirement Fund - Target	●	48.61	32.11	14.48	1.47	-	-	-	3.32
Callan Tgt Dt Idx 2050	▲	55.05	30.82	2.92	7.92	0.91	0.40	1.15	0.83

SERS 2050 Retirement Fund Period Ended September 30, 2019

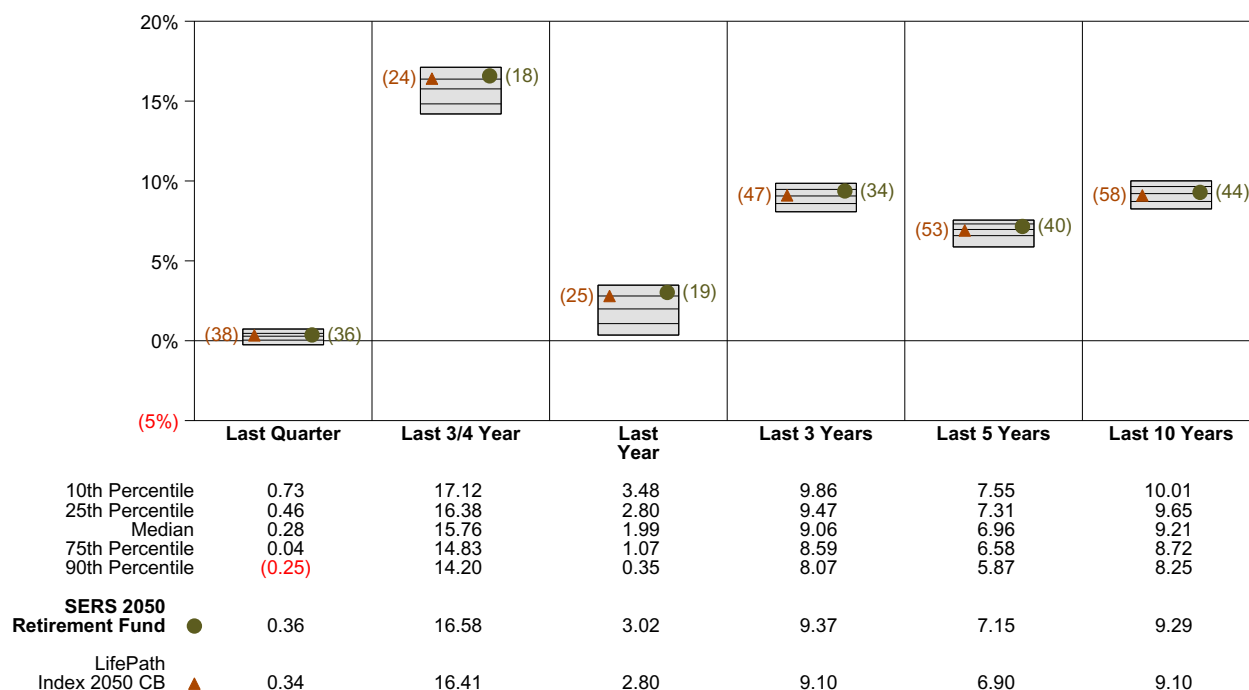
Investment Philosophy

The BlackRock LifePath(R) Index 2050 Fund (the "Fund") seeks to provide for retirement outcomes consistent with investor preferences throughout the savings and drawdown phase based on quantitatively measured risk that investors, on average, may be willing to accept. The Fund will be diversified across global asset classes, with allocations changing over the investment horizon to become more heavily oriented toward debt and debt-like securities, on the premise that individuals investing for retirement desire to reduce investment risk in their retirement accounts as their retirement date approaches.

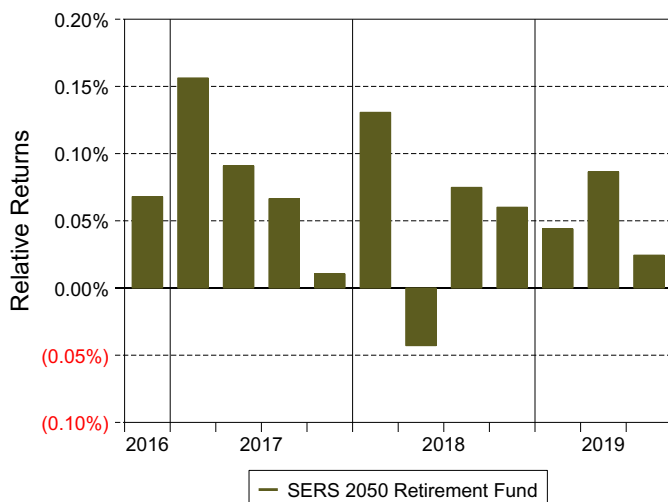
Quarterly Summary and Highlights

- SERS 2050 Retirement Fund's portfolio posted a 0.36% return for the quarter placing it in the 36 percentile of the Callan Target Date 2050 group for the quarter and in the 19 percentile for the last year.
- SERS 2050 Retirement Fund's portfolio outperformed the LifePath Index 2050 CB by 0.02% for the quarter and outperformed the LifePath Index 2050 CB for the year by 0.22%.

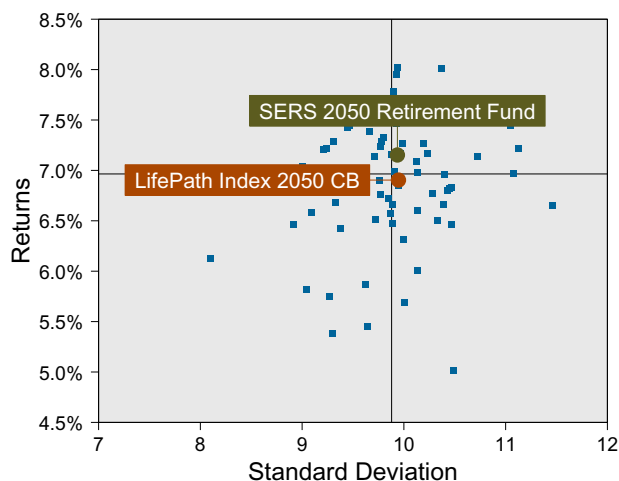
Performance vs Callan Target Date 2050 (Net)



Relative Return vs LifePath Index 2050 CB



Callan Target Date 2050 (Net) Annualized Five Year Risk vs Return

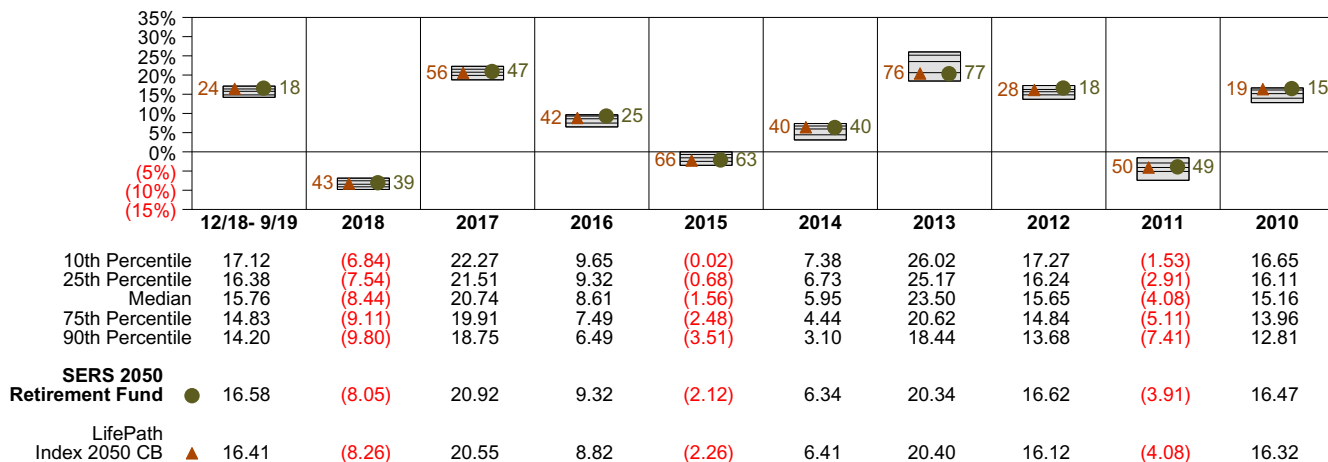


SERS 2050 Retirement Fund Return Analysis Summary

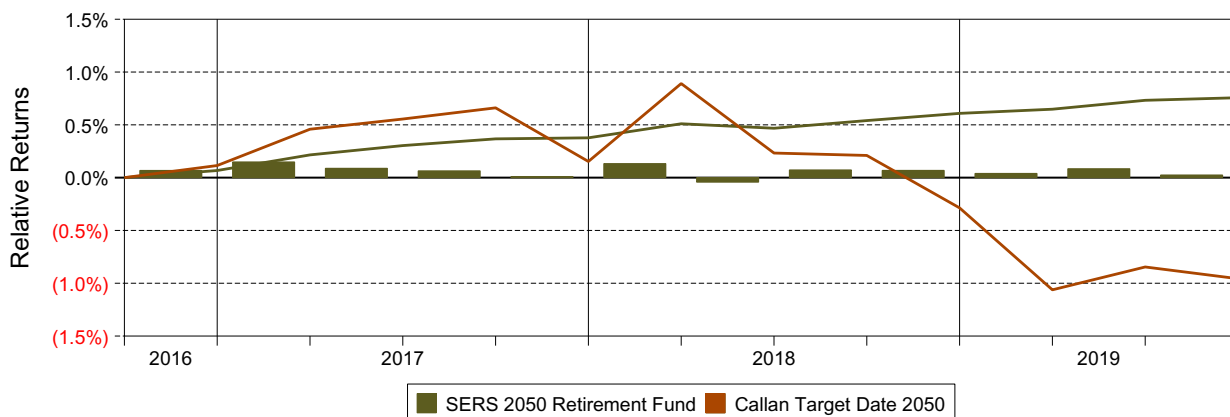
Return Analysis

The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate market benchmark. The last chart illustrates the manager's ranking relative to their style using various risk-adjusted return measures.

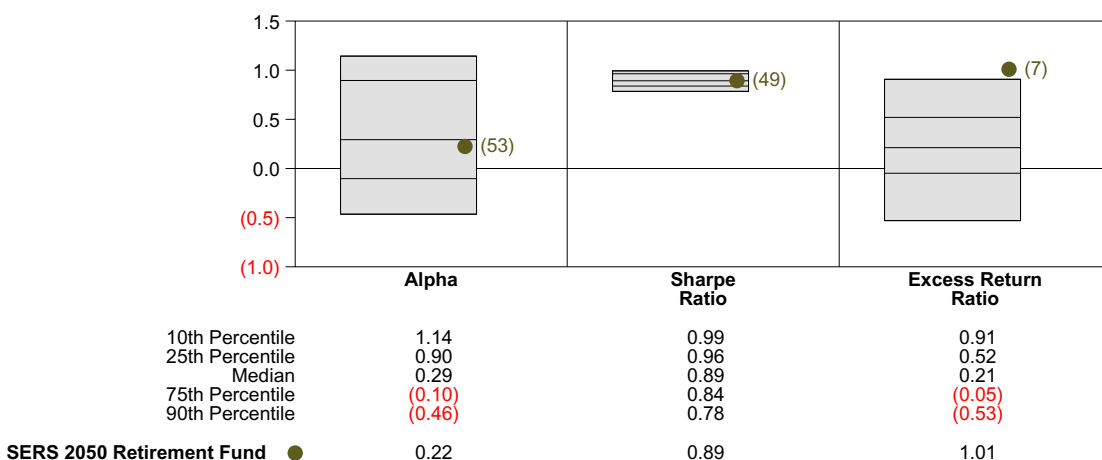
Performance vs Callan Target Date 2050 (Net)



Cumulative and Quarterly Relative Return vs LifePath Index 2050 CB



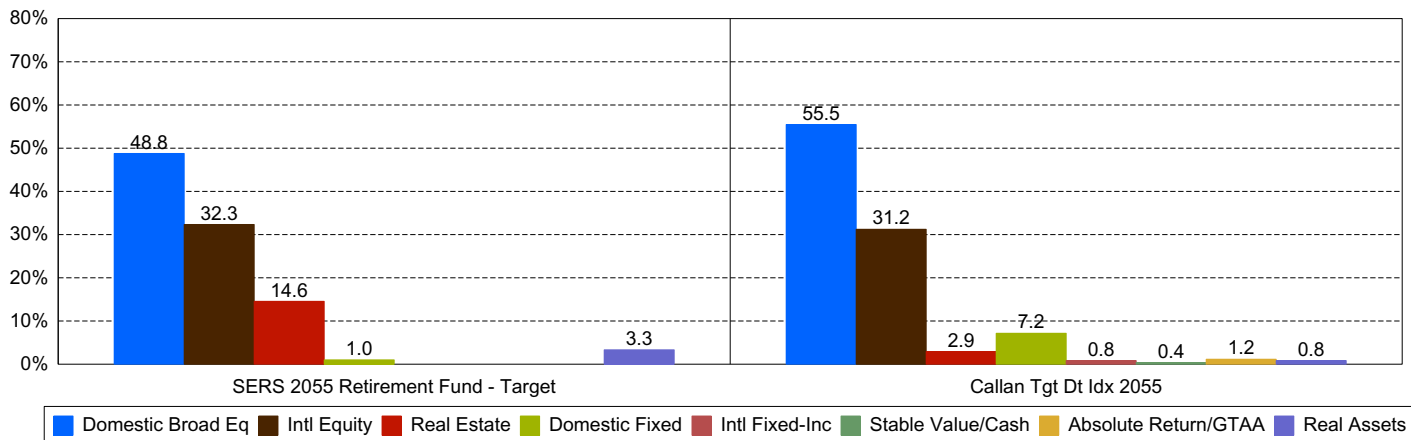
Risk Adjusted Return Measures vs LifePath Index 2050 CB Rankings Against Callan Target Date 2050 (Net) Seven Years Ended September 30, 2019



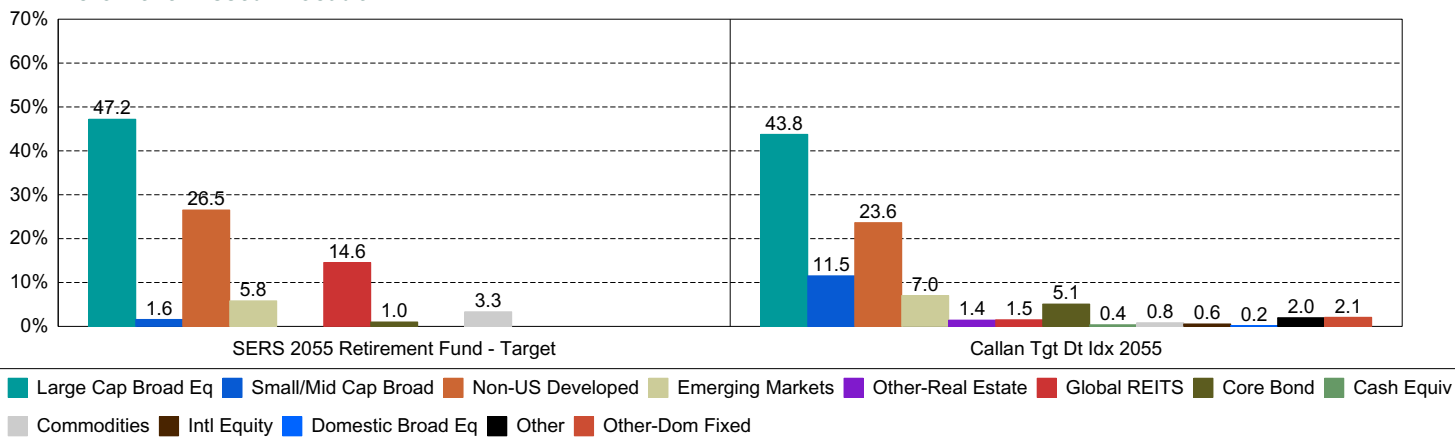
SERS 2055 Retirement Fund Target Date Fund Asset Allocation as of September 30, 2019

The charts below illustrate the current target asset allocation of the relevant target date fund based on its underlying glide path and compares it to an index. The top charts compare target asset allocation at a high "macro" asset class level, while the middle charts show a more detailed "micro" level view. The bottom chart compares the current "macro" level target asset allocation, and index, to a relevant peer group of target date funds by ranking the various target asset class weights versus those peer target date funds.

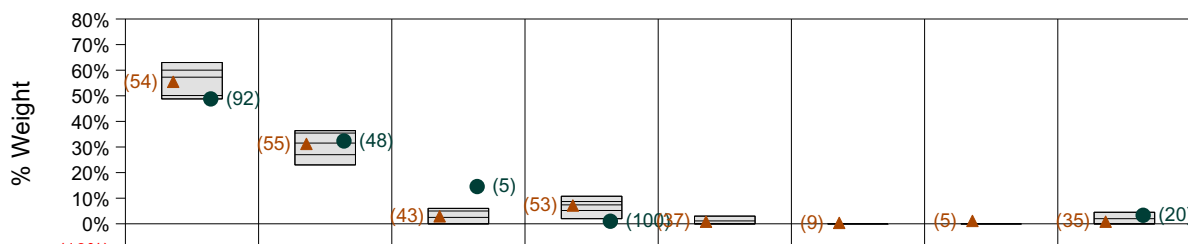
Macro-Level Asset Allocation



Micro-Level Asset Allocation



Macro Asset Allocation Rankings vs. Callan Target Date 2055



	Domestic Broad Eq	Intl Equity	Real Estate	Domestic Fixed	Intl Fixed-Inc	Stable Value/Cash	Absolute Return/GTAA	Real Assets
10th Percentile	63.00	36.40	6.02	10.76	3.00	0.00	0.00	4.50
25th Percentile	60.02	35.43	5.00	8.70	1.13	0.00	0.00	2.00
Median	57.27	31.53	2.50	7.40	0.00	0.00	0.00	0.00
75th Percentile	50.10	27.00	0.00	5.20	0.00	0.00	0.00	0.00
90th Percentile	48.78	23.00	0.00	2.00	0.00	0.00	0.00	0.00

SERS 2055 Retirement Fund - Target	●	48.78	32.34	14.55	1.00	-	-	3.33
Callan Tgt Dt Idx 2055	▲	55.48	31.23	2.93	7.16	0.83	1.15	0.84

SERS 2055 Retirement Fund Period Ended September 30, 2019

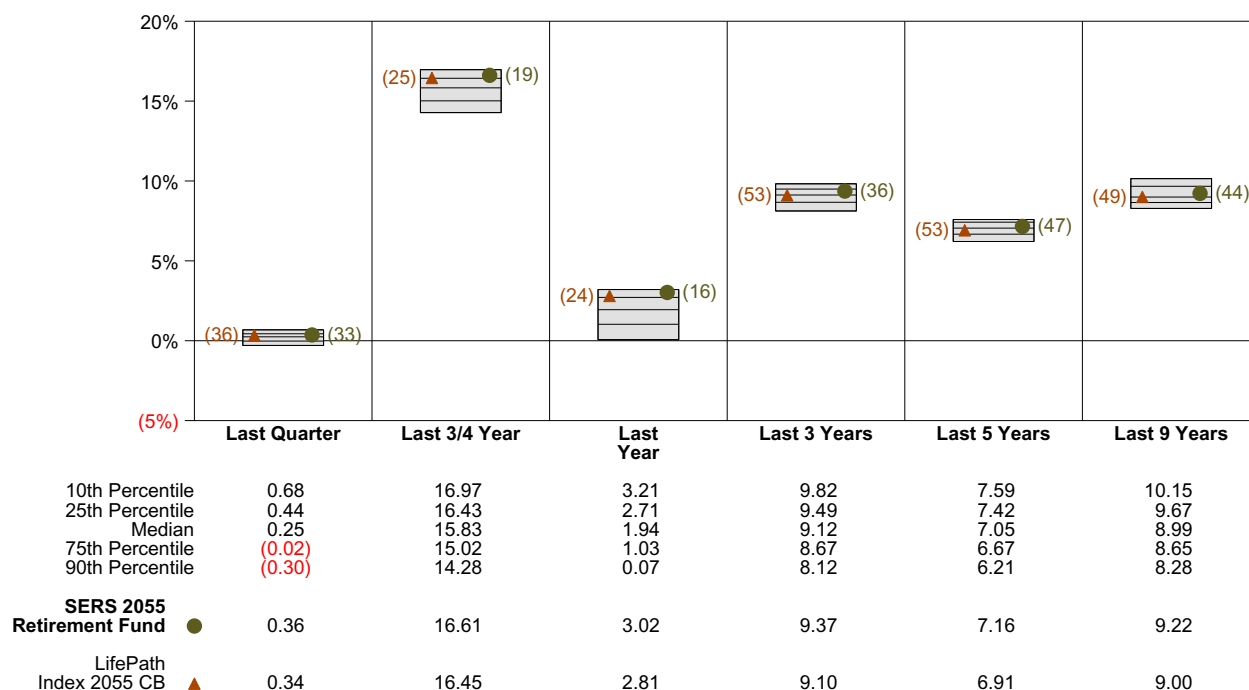
Investment Philosophy

The BlackRock LifePath(R) Index 2055 Fund (the "Fund") seeks to provide for retirement outcomes consistent with investor preferences throughout the savings and drawdown phase based on quantitatively measured risk that investors, on average, may be willing to accept. The Fund will be diversified across global asset classes, with allocations changing over the investment horizon to become more heavily oriented toward debt and debt-like securities, on the premise that individuals investing for retirement desire to reduce investment risk in their retirement accounts as their retirement date approaches.

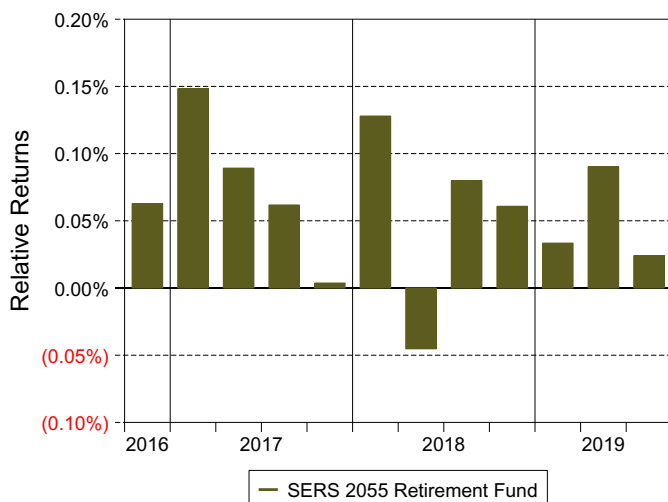
Quarterly Summary and Highlights

- SERS 2055 Retirement Fund's portfolio posted a 0.36% return for the quarter placing it in the 33 percentile of the Callan Target Date 2055 group for the quarter and in the 16 percentile for the last year.
- SERS 2055 Retirement Fund's portfolio outperformed the LifePath Index 2055 CB by 0.02% for the quarter and outperformed the LifePath Index 2055 CB for the year by 0.22%.

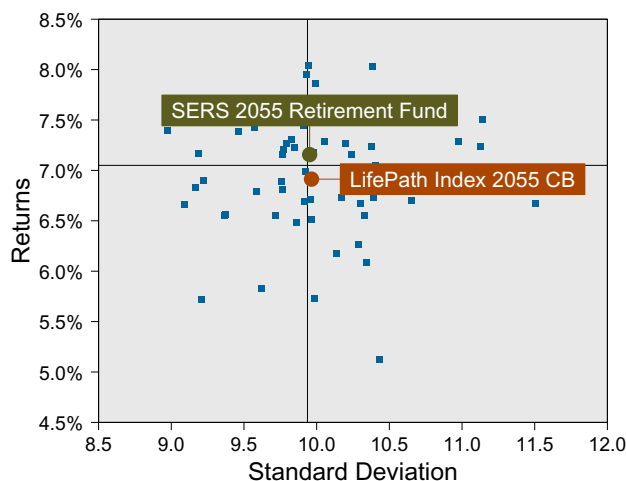
Performance vs Callan Target Date 2055 (Net)



Relative Return vs LifePath Index 2055 CB



Callan Target Date 2055 (Net) Annualized Five Year Risk vs Return

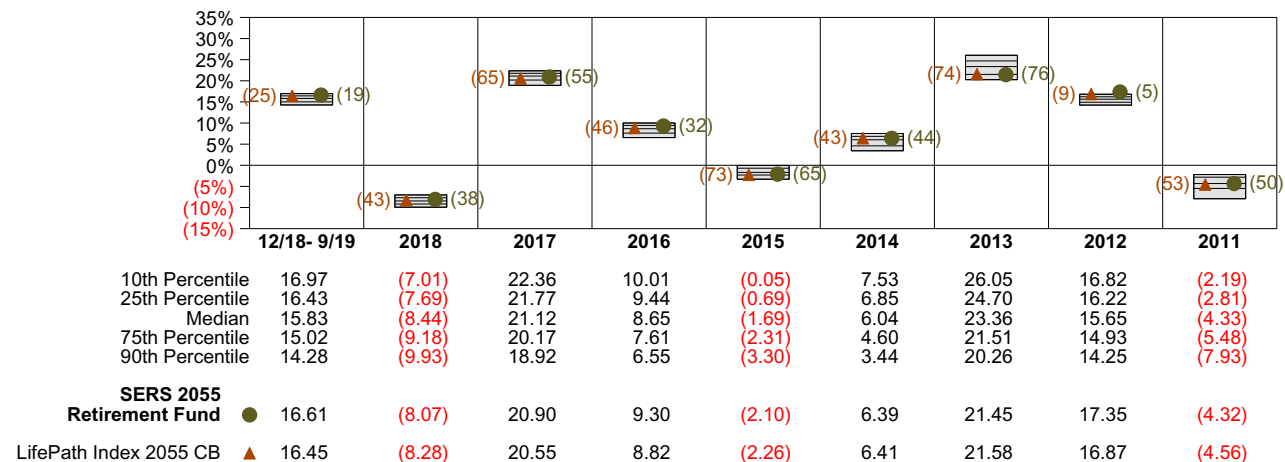


SERS 2055 Retirement Fund Return Analysis Summary

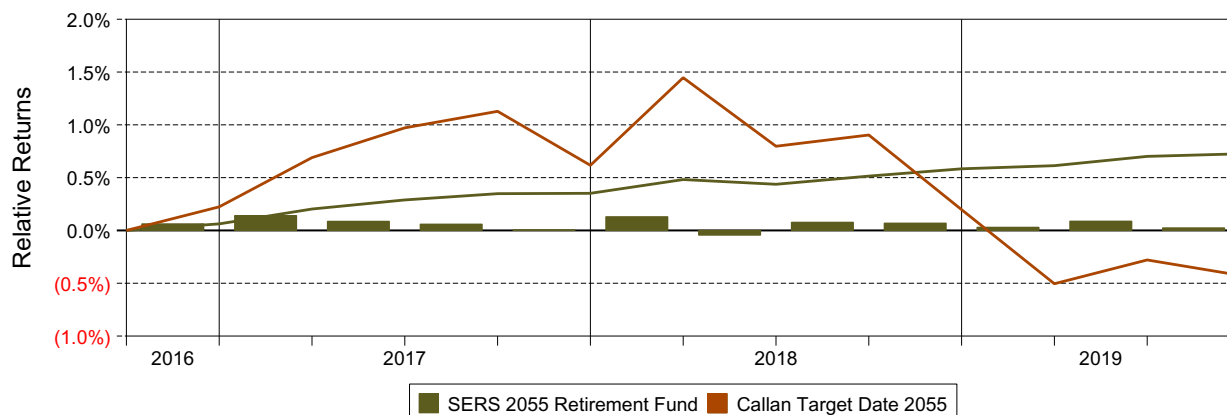
Return Analysis

The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate market benchmark. The last chart illustrates the manager's ranking relative to their style using various risk-adjusted return measures.

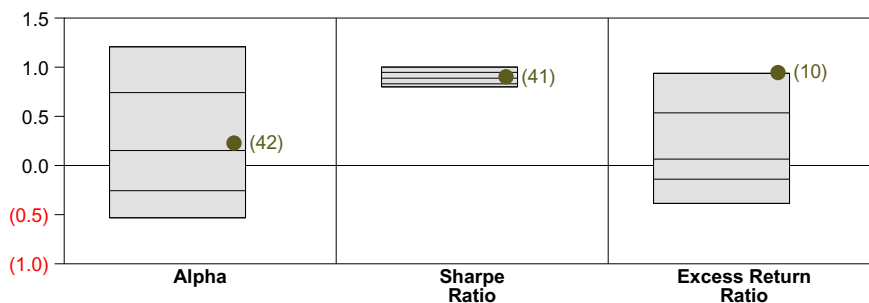
Performance vs Callan Target Date 2055 (Net)



Cumulative and Quarterly Relative Return vs LifePath Index 2055 CB



Risk Adjusted Return Measures vs LifePath Index 2055 CB Rankings Against Callan Target Date 2055 (Net) Seven Years Ended September 30, 2019



10th Percentile
25th Percentile
Median
75th Percentile
90th Percentile

1.21
0.74
0.15
(0.26)
(0.53)

1.00
0.95
0.89
0.83
0.80

0.94
0.54
0.06
(0.14)
(0.39)

SERS 2055 Retirement Fund ●

0.23

0.90

0.95

SERS 2060 Retirement Fund Period Ended September 30, 2019

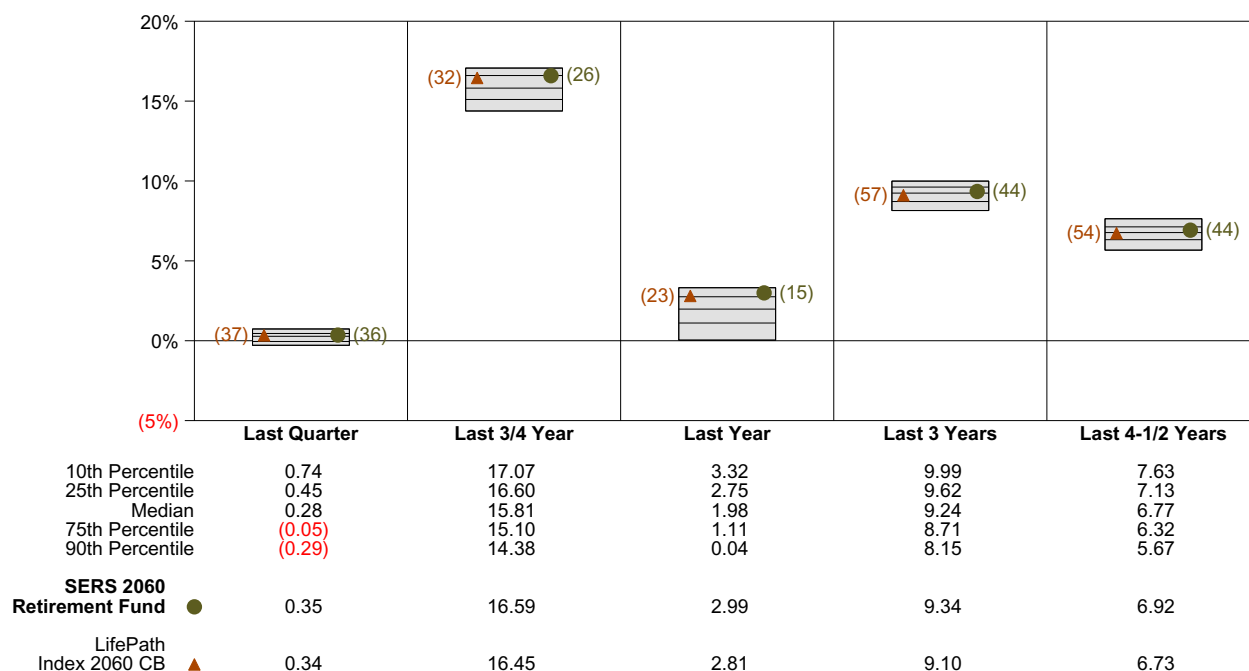
Investment Philosophy

The BlackRock LifePath(R) Index 2060 Fund (the "Fund") seeks to provide for retirement outcomes consistent with investor preferences throughout the savings and drawdown phase based on quantitatively measured risk that investors, on average, may be willing to accept. The Fund will be diversified across global asset classes, with allocations changing over the investment horizon to become more heavily oriented toward debt and debt-like securities, on the premise that individuals investing for retirement desire to reduce investment risk in their retirement accounts as their retirement date approaches.

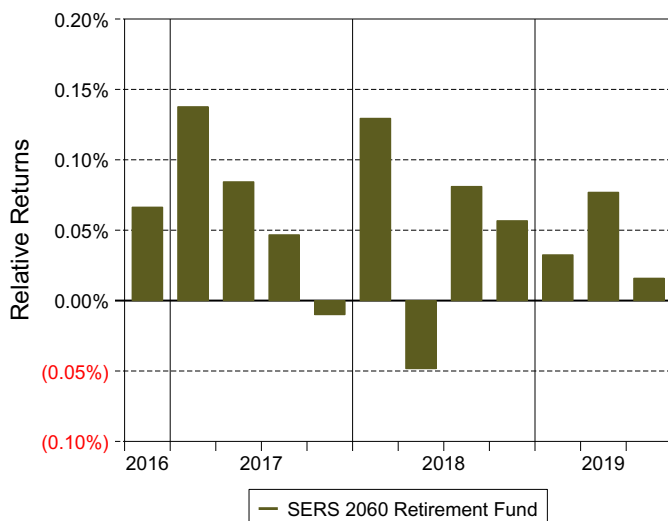
Quarterly Summary and Highlights

- SERS 2060 Retirement Fund's portfolio posted a 0.35% return for the quarter placing it in the 36 percentile of the Callan Target Date 2060 group for the quarter and in the 15 percentile for the last year.
- SERS 2060 Retirement Fund's portfolio outperformed the LifePath Index 2060 CB by 0.02% for the quarter and outperformed the LifePath Index 2060 CB for the year by 0.19%.

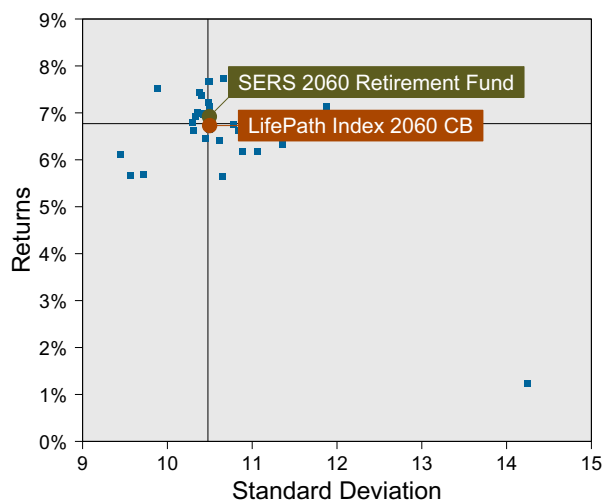
Performance vs Callan Target Date 2060 (Net)



Relative Return vs LifePath Index 2060 CB



Callan Target Date 2060 (Net) Annualized Four and One-Half Year Risk vs Return

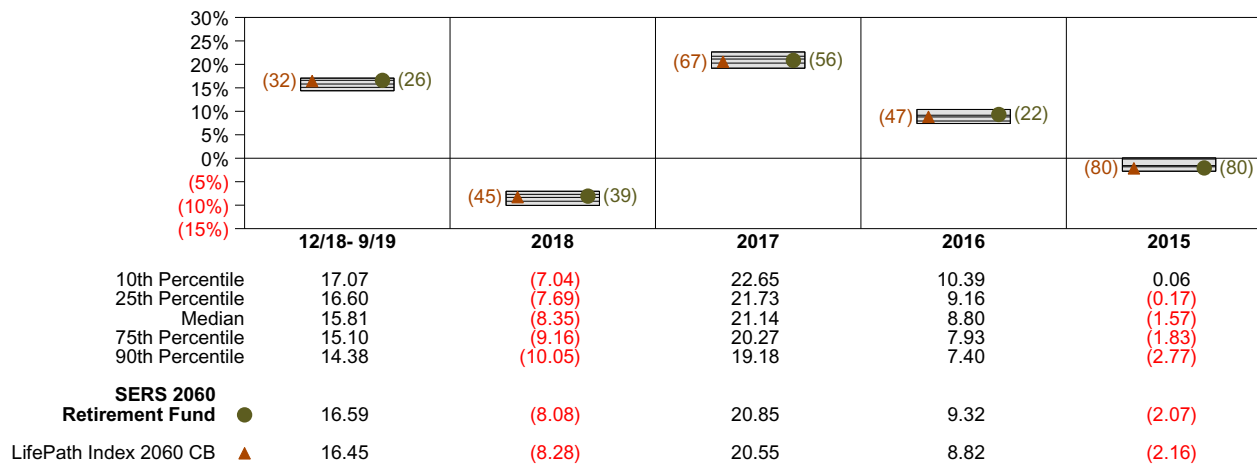


SERS 2060 Retirement Fund Return Analysis Summary

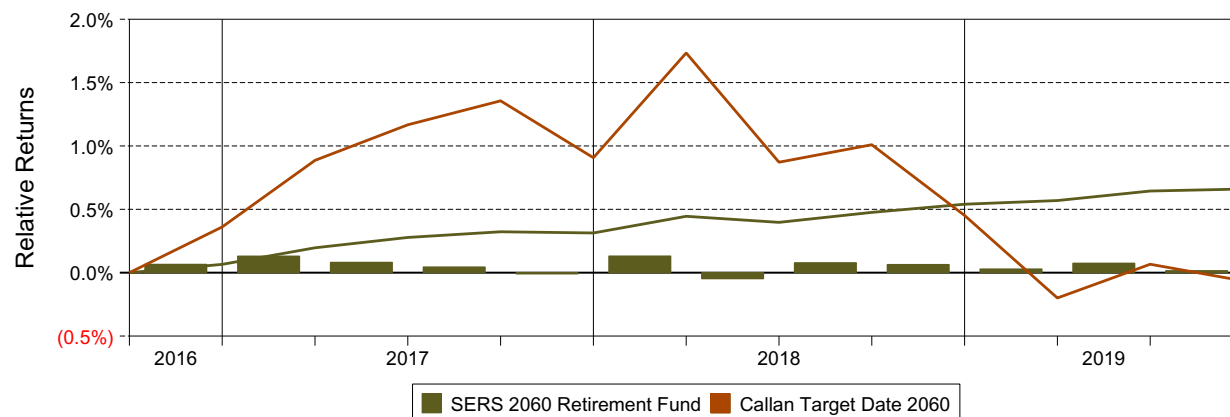
Return Analysis

The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate market benchmark. The last chart illustrates the manager's ranking relative to their style using various risk-adjusted return measures.

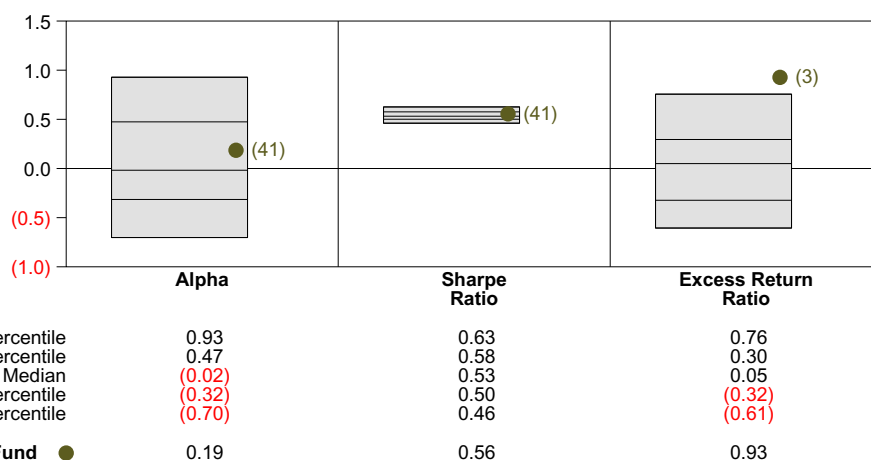
Performance vs Callan Target Date 2060 (Net)



Cumulative and Quarterly Relative Return vs LifePath Index 2060 CB



Risk Adjusted Return Measures vs LifePath Index 2060 CB Rankings Against Callan Target Date 2060 (Net) Four and One-Half Years Ended September 30, 2019



SERS U.S. Large Company Stock Index Fund

Period Ended September 30, 2019

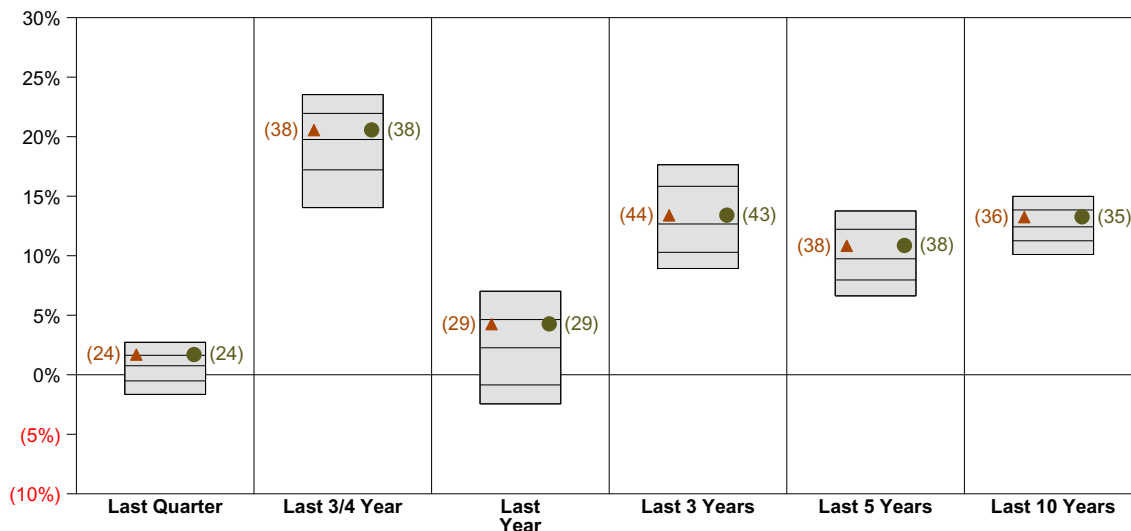
Investment Philosophy

The strategy seeks to replicate the performance and characteristics of the S&P 500 Index with minimal tracking error. Mellon Capital uses full replication to construct the portfolio, holding each security in the index in its proportionate weight. This fund is managed by Mellon Capital Management.

Quarterly Summary and Highlights

- SERS U.S. Large Company Stock Index Fund's portfolio posted a 1.70% return for the quarter placing it in the 24 percentile of the Callan Large Cap Broad Equity Mut Funds group for the quarter and in the 29 percentile for the last year.
- SERS U.S. Large Company Stock Index Fund's portfolio underperformed the S&P 500 Index by 0.00% for the quarter and outperformed the S&P 500 Index for the year by 0.02%.

Performance vs Callan Large Cap Broad Equity Mut Funds (Institutional Net)

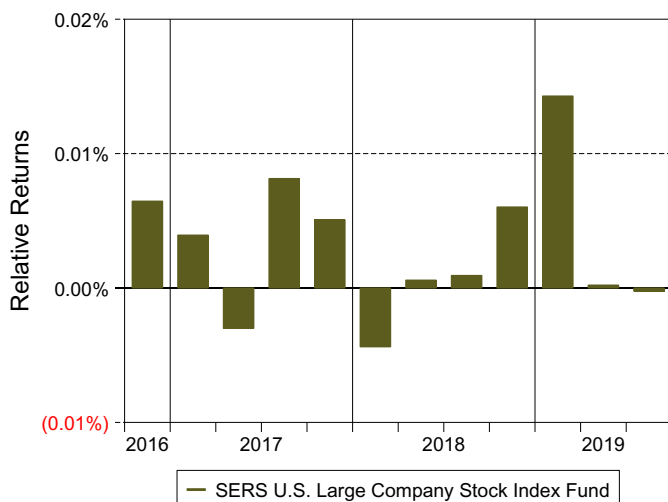


SERS U.S. Large Company Stock Index Fund

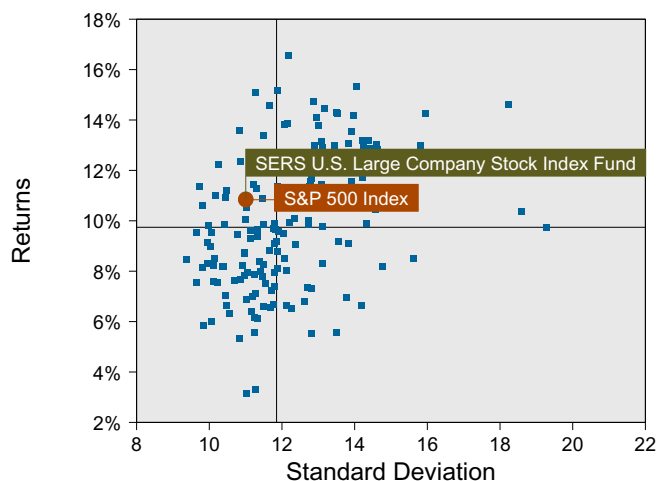
S&P 500 Index

●	1.70	20.57	4.27	13.41	10.86	13.27
▲	1.70	20.55	4.25	13.39	10.84	13.24

Relative Return vs S&P 500 Index



Callan Large Cap Broad Equity Mut Funds (Institutional Net) Annualized Five Year Risk vs Return

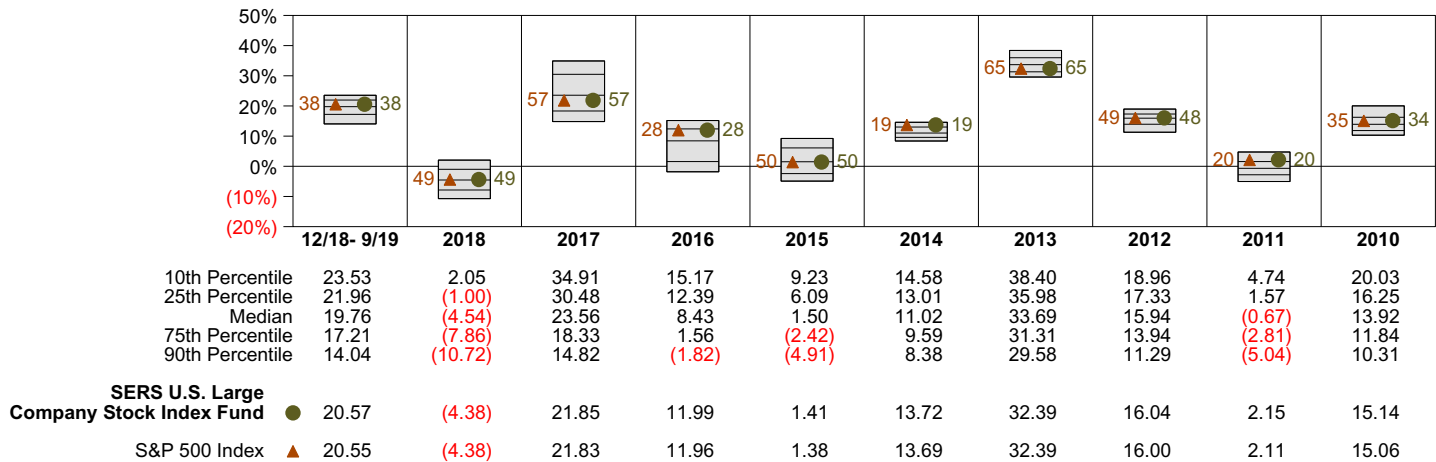


SERS U.S. Large Company Stock Index Fund Return Analysis Summary

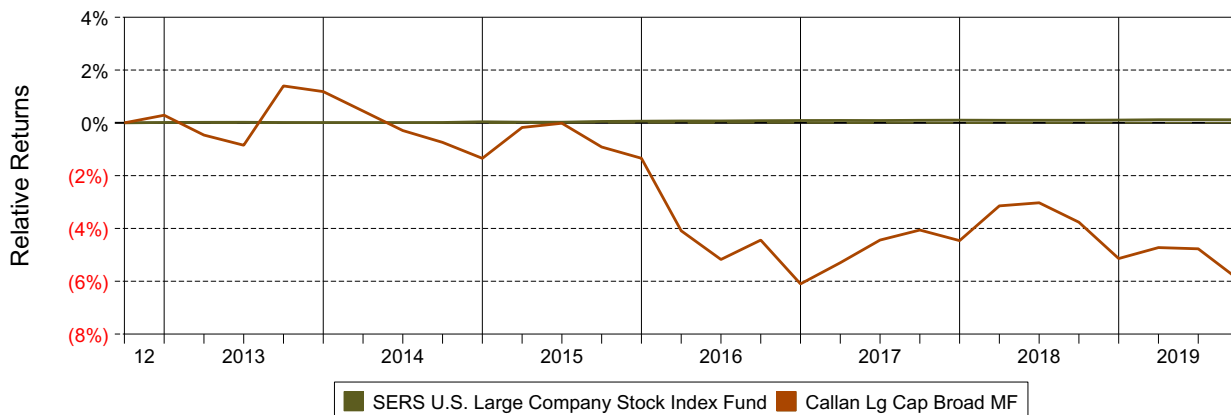
Return Analysis

The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate market benchmark. The last chart illustrates the manager's ranking relative to their style using various risk-adjusted return measures.

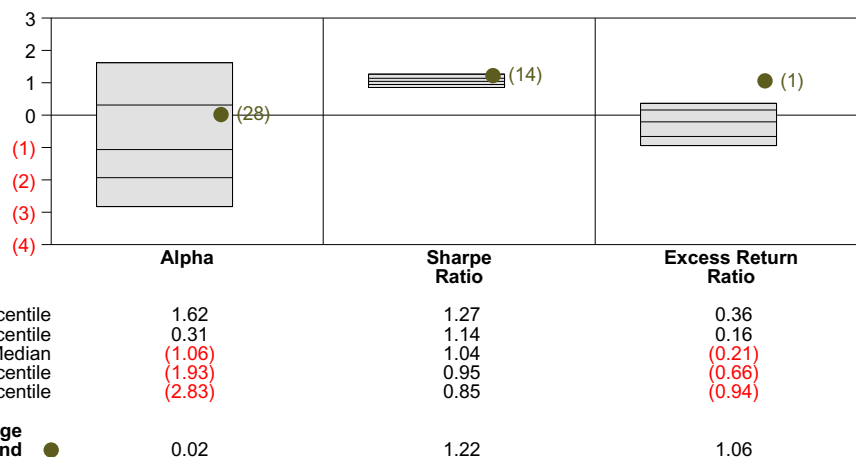
Performance vs Callan Large Cap Broad Equity Mut Funds (Institutional Net)



Cumulative and Quarterly Relative Return vs S&P 500 Index



Risk Adjusted Return Measures vs S&P 500 Index Rankings Against Callan Large Cap Broad Equity Mut Funds (Institutional Net) Seven Years Ended September 30, 2019



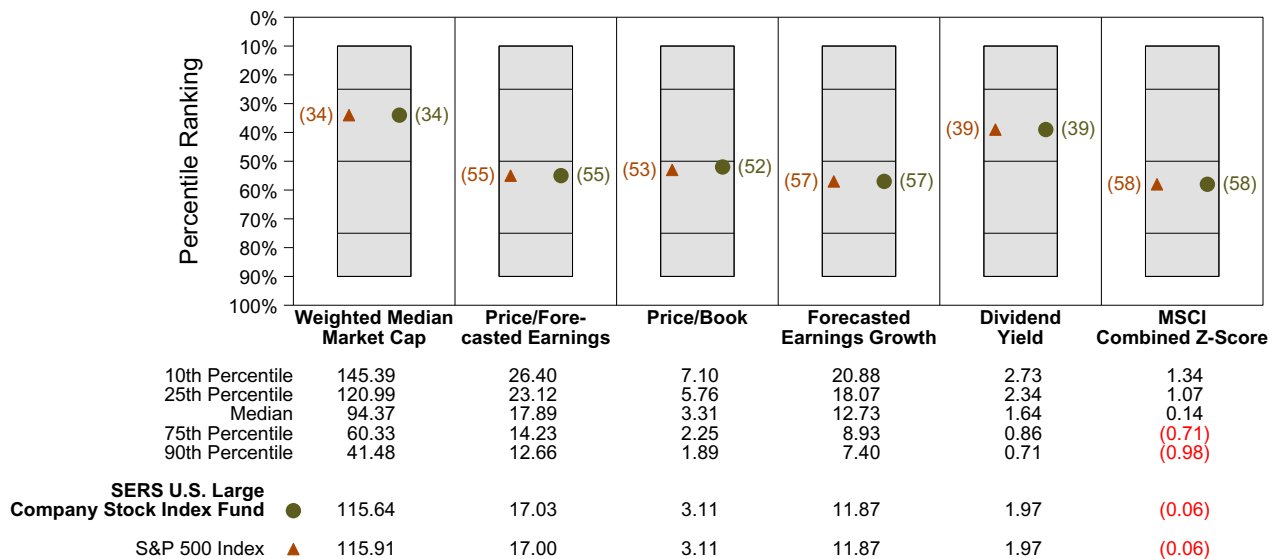
SERS U.S. Large Company Stock Index Fund

Equity Characteristics Analysis Summary

Portfolio Characteristics

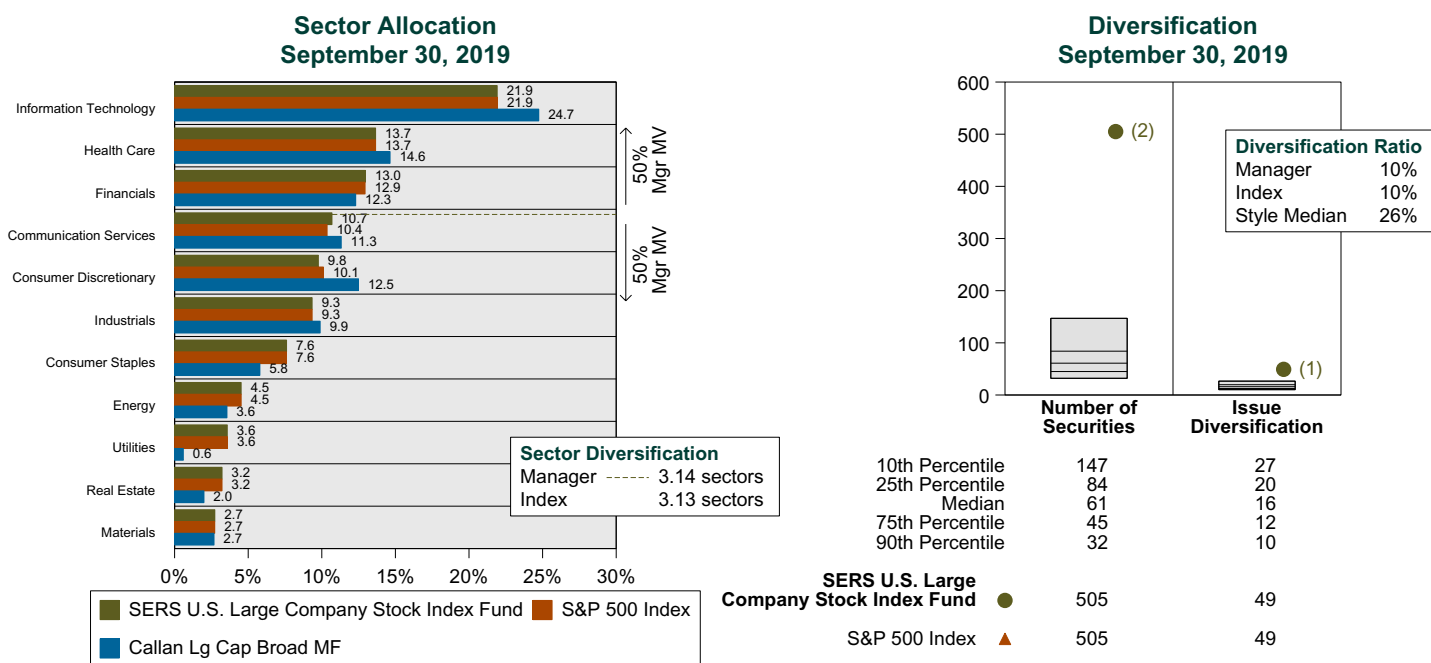
This graph compares the manager's portfolio characteristics with the range of characteristics for the portfolios which make up the manager's style group. This analysis illustrates whether the manager's current holdings are consistent with other managers employing the same style.

Portfolio Characteristics Percentile Rankings Rankings Against Callan Large Cap Broad Equity Mut Funds as of September 30, 2019



Sector Weights

The graph below contrasts the manager's sector weights with those of the benchmark and median sector weights across the members of the peer group. The magnitude of sector weight differences from the index and the manager's sector diversification are also shown. Diversification by number and concentration of holdings are also compared to the benchmark and peer group. Issue Diversification represents by count, and Diversification Ratio by percent, the number of holdings that account for half of the portfolio's market value.



SERS U.S. Large Company Stock Index Fund

Top 10 Portfolio Holdings Characteristics

as of September 30, 2019

10 Largest Holdings

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Microsoft Corp	Information Technology	\$10,539	4.3%	4.14%	1061.55	25.67	1.47%	14.15%
Apple Inc	Information Technology	\$9,446	3.8%	13.60%	1012.16	17.60	1.38%	9.68%
Amazon.Com	Consumer Discretionary	\$7,158	2.9%	(8.33)%	858.68	56.36	0.00%	83.00%
Facebook Inc Cl A	Communication Services	\$4,253	1.7%	(7.73)%	428.41	20.49	0.00%	20.05%
Berkshire Hathaway Inc Del Cl B New	Financials	\$4,045	1.6%	(2.42)%	288.38	19.50	0.00%	4.64%
JPMorgan Chase & Co	Financials	\$3,741	1.5%	6.01%	376.31	11.31	3.06%	5.45%
Alphabet Inc Cl C	Communication Services	\$3,661	1.5%	12.78%	423.41	22.55	0.00%	12.56%
Alphabet Inc Cl A	Communication Services	\$3,631	1.5%	12.78%	365.77	22.61	0.00%	12.56%
Johnson & Johnson	Health Care	\$3,392	1.4%	(6.42)%	341.46	14.39	2.94%	6.54%
Procter & Gamble Co	Consumer Staples	\$3,088	1.3%	14.17%	311.28	25.22	2.40%	7.09%

10 Best Performers

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Kla-Tencor Corp	Information Technology	\$256	0.1%	35.67%	25.27	16.19	1.88%	14.57%
Western Digital Corp	Information Technology	\$172	0.1%	25.43%	17.73	15.41	3.35%	(13.80)%
Target Corp	Consumer Discretionary	\$543	0.2%	24.39%	54.62	16.58	2.47%	9.35%
Lam Research Corp	Information Technology	\$334	0.1%	23.65%	33.47	15.66	1.99%	(0.06)%
Newell Brands Inc	Consumer Discretionary	\$71	0.0%	23.10%	7.93	11.87	4.91%	(14.00)%
D.R. Horton	Consumer Discretionary	\$178	0.1%	22.60%	19.49	11.47	1.14%	13.00%
Hunt (J.B.) Transport	Industrials	\$95	0.0%	21.36%	11.81	18.66	0.94%	8.91%
Kellogg Co	Consumer Staples	\$158	0.1%	21.21%	21.92	16.14	3.54%	0.75%
Sherwin-Williams Co	Materials	\$448	0.2%	20.24%	50.73	23.52	0.82%	14.30%
Kroger Co	Consumer Staples	\$207	0.1%	19.61%	20.67	11.31	2.48%	5.20%

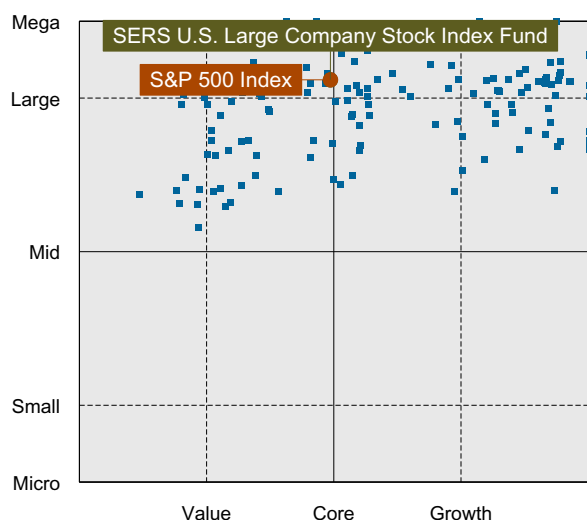
10 Worst Performers

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Nektar Therapeutics	Health Care	\$31	0.0%	(48.81)%	3.19	(7.00)	0.00%	-
Dxc Technology Co	Information Technology	\$78	0.0%	(46.15)%	7.73	3.77	2.85%	6.69%
Concho Res Inc	Energy	\$136	0.1%	(34.08)%	13.65	14.98	0.74%	12.03%
Align Technology Inc	Health Care	\$130	0.1%	(33.90)%	14.45	29.80	0.00%	19.50%
Abiomed Inc	Health Care	\$79	0.0%	(31.71)%	8.07	34.28	0.00%	24.20%
Ulta Salon Cosmetics & Frag I	Consumer Discretionary	\$146	0.1%	(27.74)%	14.75	19.46	0.00%	10.22%
Netflix Inc	Communication Services	\$1,163	0.5%	(27.14)%	117.17	52.93	0.00%	47.60%
Macys Inc	Consumer Discretionary	\$49	0.0%	(25.98)%	4.80	5.79	9.72%	(14.79)%
Alexion Pharmaceuticals Inc	Health Care	\$217	0.1%	(25.23)%	21.96	9.13	0.00%	17.18%
L Brands Inc	Consumer Discretionary	\$44	0.0%	(23.78)%	5.41	7.98	6.13%	6.10%

Historical Holdings Based Style Analysis SERS U.S. Large Company Stock Index Fund For Three Years Ended September 30, 2019

This page analyzes the historical investment style of a portfolio utilizing a detailed holdings-based style analysis to determine average actual exposures to various market capitalization and style segments of the domestic equity market. The market is segmented quarterly by capitalization and style. The capitalization segments are dictated by capitalization decile breakpoints. The style segments are determined using the "Combined Z Score", based on the eight fundamental factors used in the MSCI stock style scoring system. The upper-left style map illustrates the average historical market capitalization and style score of the portfolio relative to indices and/or peers. The upper-right style exposure matrix displays the average historical portfolio and index weights and stock counts (in parentheses) in each capitalization/style segment of the market. The next two style exposure charts illustrate the actual quarterly cap/style and style only segment exposures of the portfolio through history.

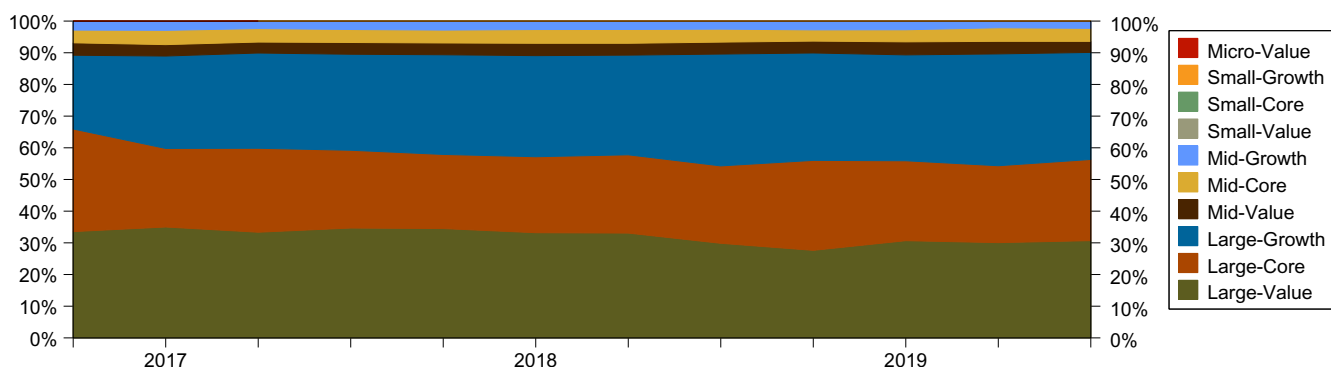
Average Style Map vs Callan Lg Cap Broad MF Holdings for Three Years Ended September 30, 2019



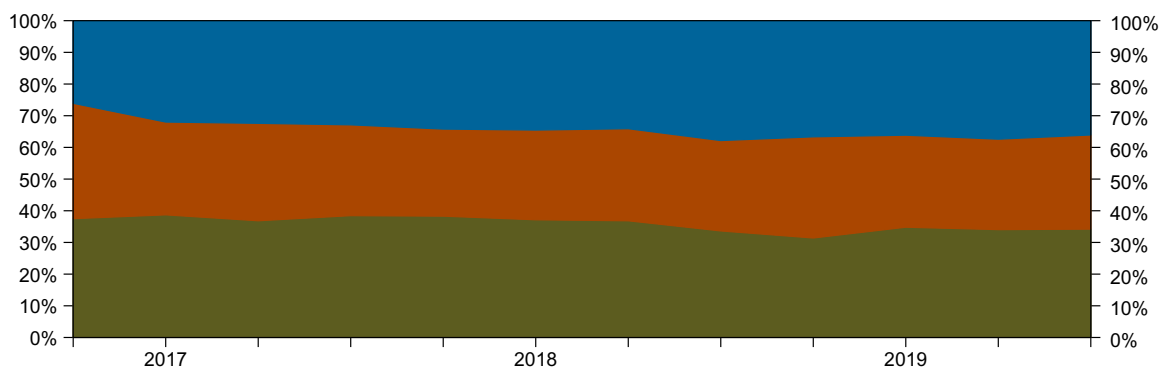
Average Style Exposure Matrix Holdings for Three Years Ended September 30, 2019

	32.2% (105)	25.7% (93)	31.6% (86)	89.5% (284)
Large	32.1% (105)	25.7% (93)	31.7% (87)	89.5% (285)
Mid	3.8% (83)	4.1% (83)	2.6% (49)	10.5% (215)
	3.8% (83)	4.1% (83)	2.6% (49)	10.4% (215)
Small	0.0% (2)	0.0% (0)	0.0% (1)	0.0% (3)
	0.0% (2)	0.0% (0)	0.0% (1)	0.1% (3)
Micro	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)
	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)
Total	36.0% (190)	29.8% (176)	34.2% (136)	100.0% (502)
	35.9% (190)	29.8% (176)	34.2% (137)	100.0% (503)
	Value	Core	Growth	Total

SERS U.S. Large Company Stock Index Fund Historical Cap/Style Exposures



SERS U.S. Large Company Stock Index Fund Historical Style Only Exposures



SERS U.S. All Company Index Fund Period Ended September 30, 2019

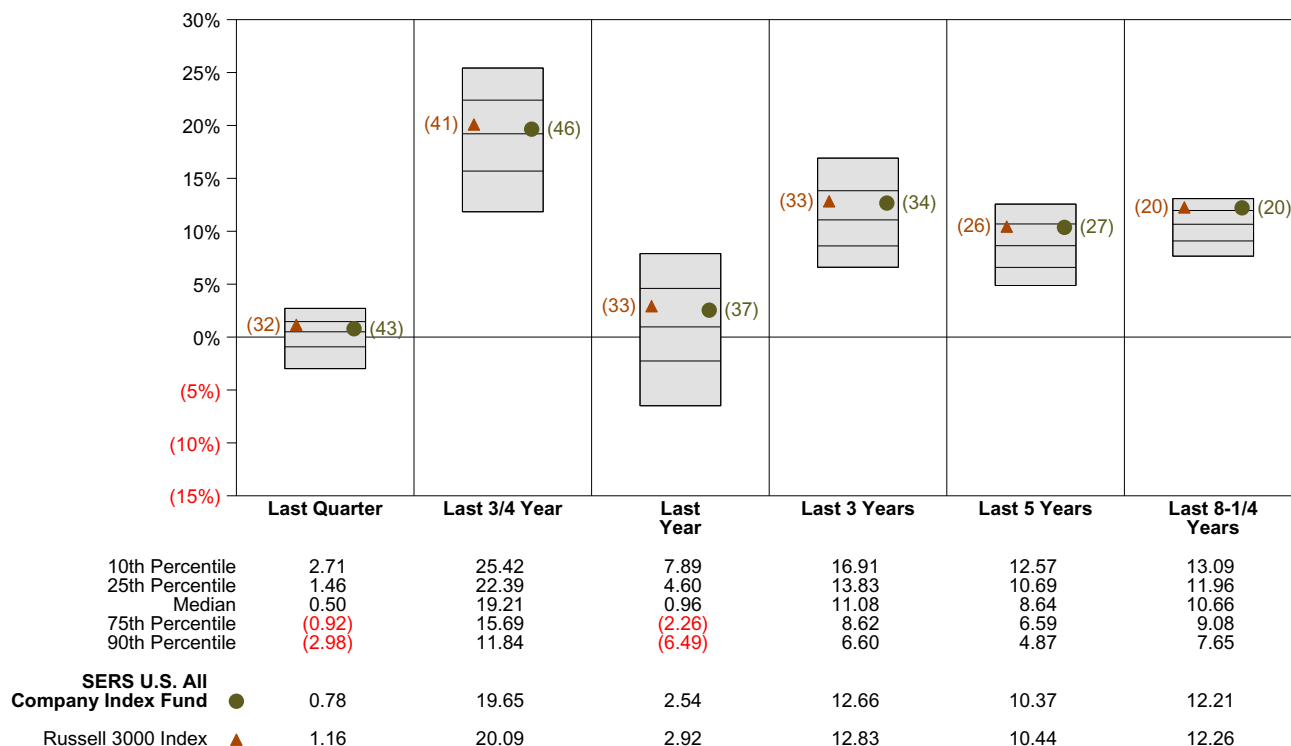
Investment Philosophy

The U.S. All Company Stock Index Fund's Investment objective is to track the performance of the Russell 3000 index. In meeting this objective, the Fund may invest in securities and a combination of other collective funds that together are designed to track the performance of the Index. The Fund will principally invest in other affiliated bank collective funds and equity securities, including common stock of U.S. companies. This fund is managed by Mellon Capital Management.

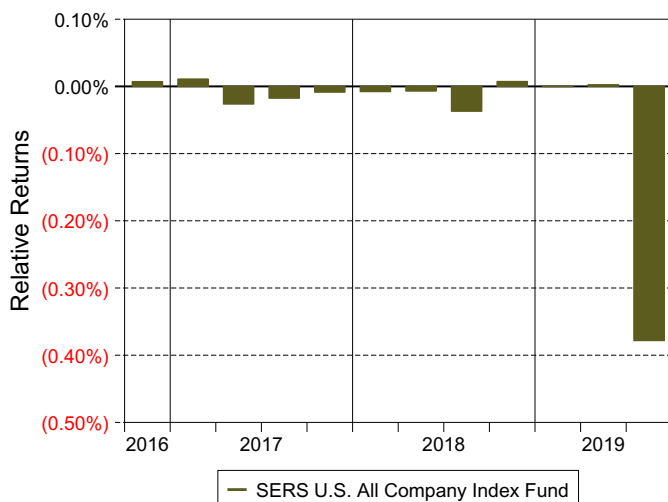
Quarterly Summary and Highlights

- SERS U.S. All Company Index Fund's portfolio posted a 0.78% return for the quarter placing it in the 43 percentile of the Callan Multi Cap Broad Mutual Funds group for the quarter and in the 37 percentile for the last year.
- SERS U.S. All Company Index Fund's portfolio underperformed the Russell 3000 Index by 0.38% for the quarter and underperformed the Russell 3000 Index for the year by 0.37%.

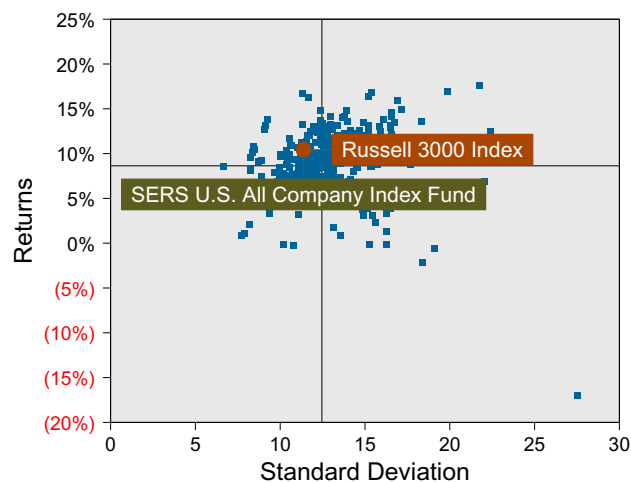
Performance vs Callan Multi Cap Broad Mutual Funds (Institutional Net)



Relative Return vs Russell 3000 Index



Callan Multi Cap Broad Mutual Funds (Institutional Net) Annualized Five Year Risk vs Return

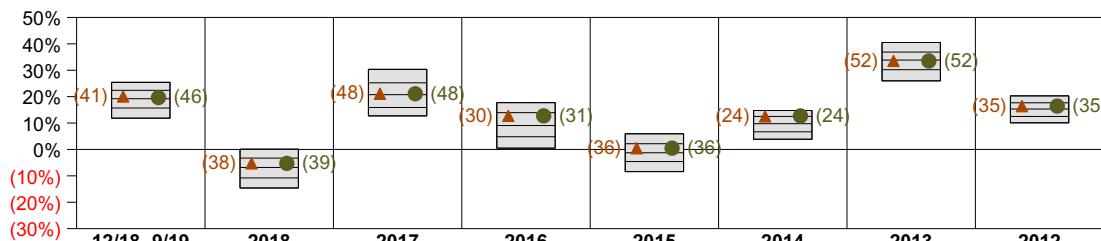


SERS U.S. All Company Index Fund Return Analysis Summary

Return Analysis

The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate market benchmark. The last chart illustrates the manager's ranking relative to their style using various risk-adjusted return measures.

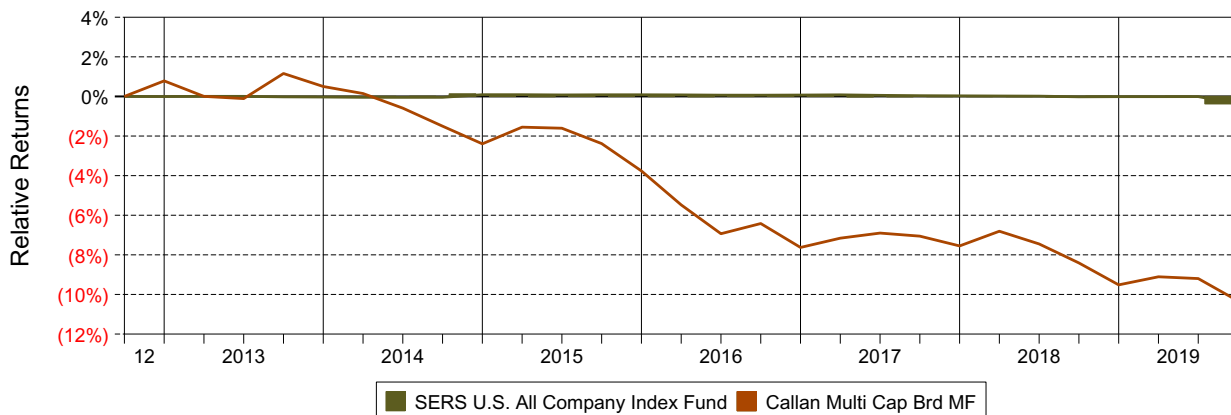
Performance vs Callan Multi Cap Broad Mutual Funds (Institutional Net)



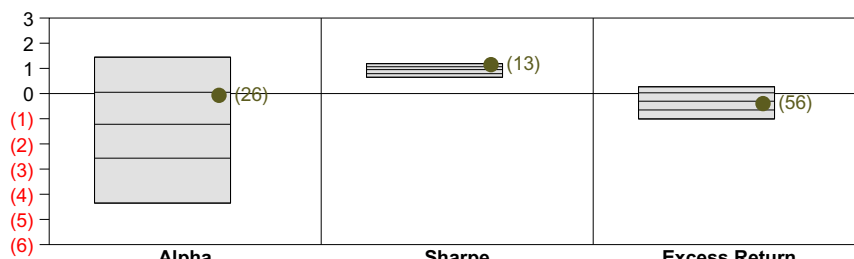
10th Percentile	25.42	0.10	30.34	17.73	5.93	14.75	40.50	20.30
25th Percentile	22.39	(3.28)	25.23	13.93	2.16	12.50	36.88	17.66
Median	19.21	(6.82)	20.75	9.05	(1.26)	9.75	33.84	15.30
75th Percentile	15.69	(10.78)	15.88	4.81	(4.59)	6.68	30.20	12.50
90th Percentile	11.84	(14.61)	12.70	0.47	(8.39)	3.86	25.98	10.08

SERS U.S. All Company Index Fund	●	19.65	(5.28)	21.08	12.72	0.47	12.69	33.52	16.42
Russell 3000 Index	▲	20.09	(5.24)	21.13	12.74	0.48	12.56	33.55	16.42

Cumulative and Quarterly Relative Return vs Russell 3000 Index



Risk Adjusted Return Measures vs Russell 3000 Index Rankings Against Callan Multi Cap Broad Mutual Funds (Institutional Net) Seven Years Ended September 30, 2019



10th Percentile	1.45	1.19	0.27
25th Percentile	0.05	1.07	0.03
Median	(1.22)	0.95	(0.30)
75th Percentile	(2.57)	0.79	(0.65)
90th Percentile	(4.35)	0.65	(1.01)

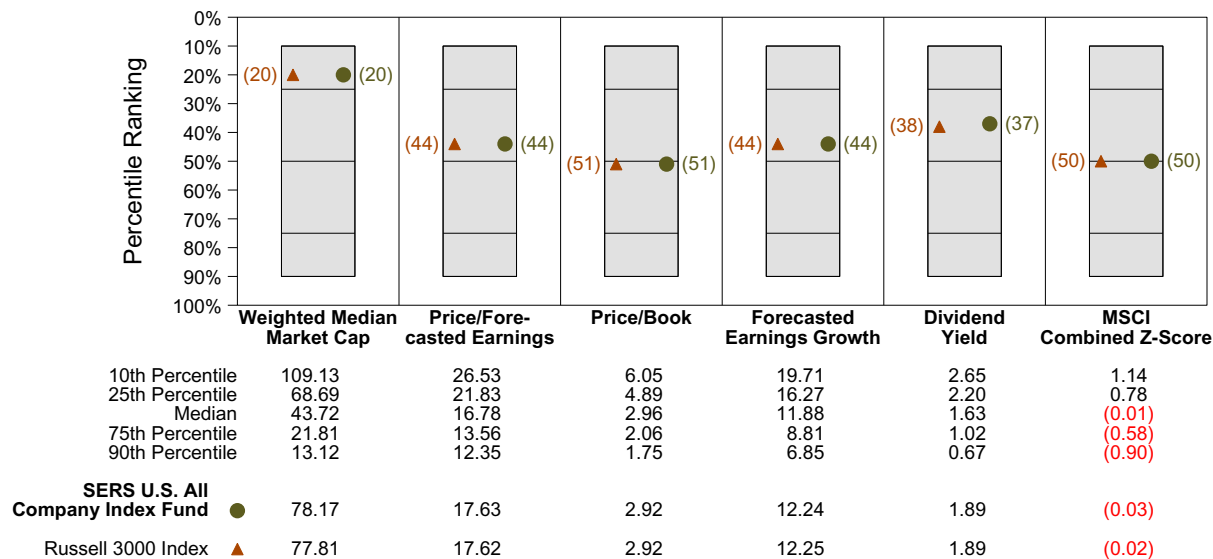
SERS U.S. All Company Index Fund	●	(0.07)	1.15	(0.40)
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SERS U.S. All Company Index Fund Equity Characteristics Analysis Summary

Portfolio Characteristics

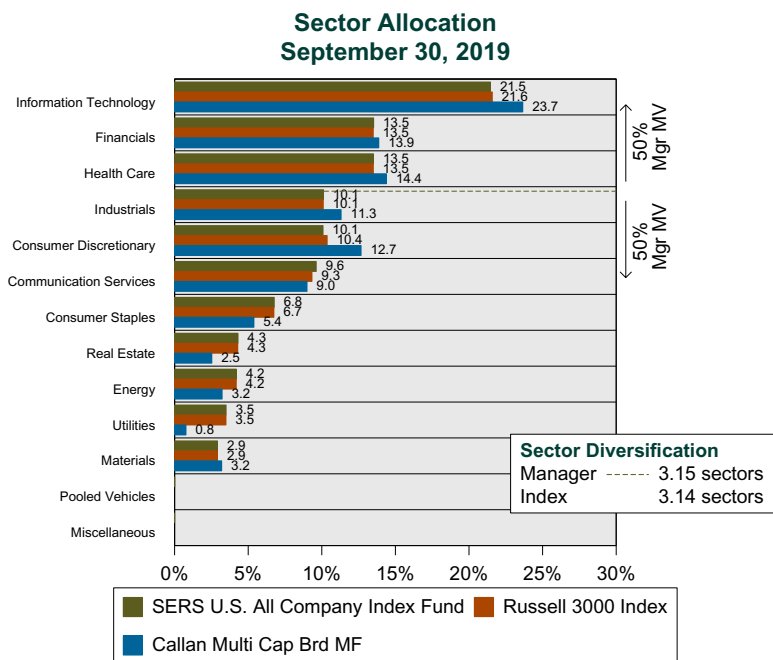
This graph compares the manager's portfolio characteristics with the range of characteristics for the portfolios which make up the manager's style group. This analysis illustrates whether the manager's current holdings are consistent with other managers employing the same style.

Portfolio Characteristics Percentile Rankings Rankings Against Callan Multi Cap Broad Mutual Funds as of September 30, 2019

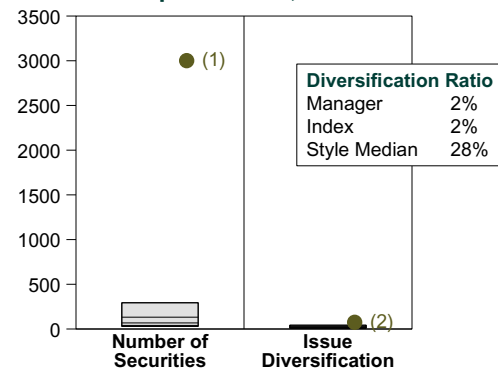


Sector Weights

The graph below contrasts the manager's sector weights with those of the benchmark and median sector weights across the members of the peer group. The magnitude of sector weight differences from the index and the manager's sector diversification are also shown. Diversification by number and concentration of holdings are also compared to the benchmark and peer group. Issue Diversification represents by count, and Diversification Ratio by percent, the number of holdings that account for half of the portfolio's market value.



Diversification September 30, 2019



10th Percentile	293	42
25th Percentile	132	29
Median	68	18
75th Percentile	40	12
90th Percentile	29	10
SERS U.S. All Company Index Fund	3001	75
Russell 3000 Index	3032	75

SERS U.S. All Company Index Fund

Top 10 Portfolio Holdings Characteristics

as of September 30, 2019

10 Largest Holdings

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Microsoft Corp	Information Technology	\$3,595	3.6%	4.14%	1061.55	25.67	1.47%	14.15%
Apple Inc	Information Technology	\$3,462	3.4%	13.60%	1012.16	17.60	1.38%	9.68%
Amazon.Com	Consumer Discretionary	\$2,454	2.4%	(8.33)%	858.68	56.36	0.00%	83.00%
Facebook Inc Cl A	Communication Services	\$1,455	1.4%	(7.73)%	428.41	20.49	0.00%	20.05%
Berkshire Hathaway Inc Del Cl B New	Financials	\$1,392	1.4%	(2.42)%	288.38	19.50	0.00%	4.64%
JPMorgan Chase & Co	Financials	\$1,280	1.3%	6.01%	376.31	11.31	3.06%	5.45%
Alphabet Inc Cl C	Communication Services	\$1,267	1.3%	12.78%	423.41	22.55	0.00%	12.56%
Alphabet Inc Cl A	Communication Services	\$1,250	1.2%	12.78%	365.77	22.61	0.00%	12.56%
Johnson & Johnson	Health Care	\$1,176	1.2%	(6.42)%	341.46	14.39	2.94%	6.54%
Procter & Gamble Co	Consumer Staples	\$1,050	1.0%	14.17%	311.28	25.22	2.40%	7.09%

10 Best Performers

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Cim Coml Tr Corp	Financials	\$0	0.0%	177.09%	0.23	0.71	1.48%	159.32%
Nextcure	Health Care	\$0	0.0%	105.94%	0.70	(15.93)	0.00%	-
Dova Pharmaceuticals Inc	Health Care	\$1	0.0%	98.23%	0.81	(14.41)	0.00%	-
Ww Intl Inc	Consumer Discretionary	\$6	0.0%	98.01%	2.55	18.91	0.00%	15.00%
Donnelley R R & Sons Co	Industrials	\$1	0.0%	94.67%	0.27	4.48	3.18%	(27.60)%
Infinera Corporation	Information Technology	\$3	0.0%	87.29%	0.98	(34.06)	0.00%	122.03%
Lannet Inc	Health Care	\$1	0.0%	84.82%	0.45	8.33	0.00%	15.00%
Owens & Minor Inc New	Health Care	\$1	0.0%	81.64%	0.37	7.75	0.17%	(11.16)%
Allakos Inc	Health Care	\$5	0.0%	81.47%	3.81	(36.14)	0.00%	-
Solid Biosciences Inc	Health Care	\$1	0.0%	79.83%	0.48	(4.25)	0.00%	-

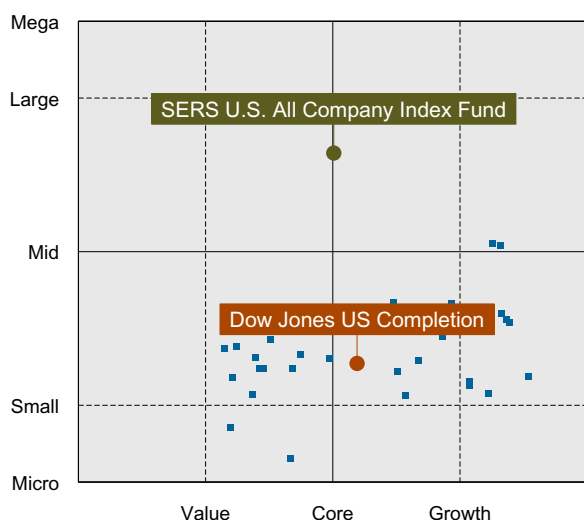
10 Worst Performers

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Tocagen Inc	Health Care	\$0	0.0%	(90.09)%	0.02	(0.34)	0.00%	-
Waitr Hldgs Inc	Consumer Discretionary	\$0	0.0%	(79.57)%	0.10	(1.44)	0.00%	(0.46)%
Mcdermott Intl Inc	Energy	\$1	0.0%	(79.09)%	0.37	2.20	0.00%	(5.26)%
Sonim Technologies Inc Common Stock	Information Technology	\$0	0.0%	(76.98)%	0.06	(24.21)	0.00%	25.00%
Synlogic Inc	Health Care	\$0	0.0%	(74.84)%	0.07	(1.21)	0.00%	-
Mallinckrodt	Health Care	\$1	0.0%	(73.75)%	0.20	0.31	0.00%	(9.60)%
Clovis Oncology Inc	Health Care	\$1	0.0%	(73.57)%	0.21	(0.63)	0.00%	33.70%
Bloom Energy Corp Com Cl A	Industrials	\$1	0.0%	(73.51)%	0.23	(13.49)	0.00%	25.00%
Chaparral Energy Inc Com Cl A	Energy	\$0	0.0%	(71.55)%	0.06	(6.91)	0.00%	-
Pacific Drilling (Nys)	Energy	\$0	0.0%	(68.97)%	0.29	(0.47)	0.00%	38.09%

Historical Holdings Based Style Analysis SERS U.S. All Company Index Fund For One Year Ended September 30, 2019

This page analyzes the historical investment style of a portfolio utilizing a detailed holdings-based style analysis to determine average actual exposures to various market capitalization and style segments of the domestic equity market. The market is segmented quarterly by capitalization and style. The capitalization segments are dictated by capitalization decile breakpoints. The style segments are determined using the "Combined Z Score", based on the eight fundamental factors used in the MSCI stock style scoring system. The upper-left style map illustrates the average historical market capitalization and style score of the portfolio relative to indices and/or peers. The upper-right style exposure matrix displays the average historical portfolio and index weights and stock counts (in parentheses) in each capitalization/style segment of the market. The next two style exposure charts illustrate the actual quarterly cap/style and style only segment exposures of the portfolio through history.

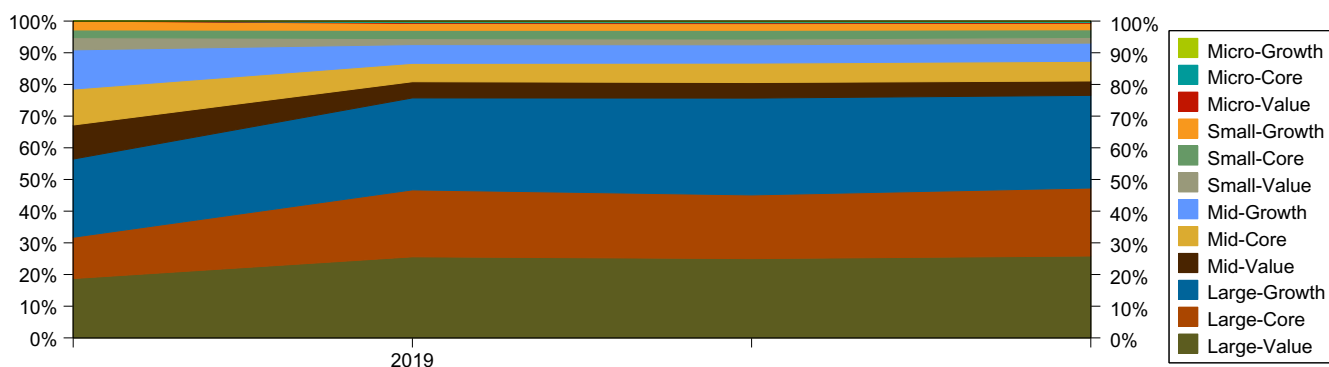
**Average Style Map vs Callan SMID Broad MFs
Holdings for One Year Ended September 30, 2019**



**Average Style Exposure Matrix
Holdings for One Year Ended September 30, 2019**

	Value	Core	Growth	Total
Large	23.8% (90) 0.8% (3)	18.9% (83) 0.5% (3)	28.4% (80) 5.0% (10)	71.1% (253) 6.3% (16)
Mid	6.3% (166) 10.6% (88)	7.4% (195) 16.1% (133)	7.4% (196) 22.6% (161)	21.2% (557) 49.3% (382)
Small	2.3% (279) 11.0% (326)	2.6% (379) 15.6% (487)	2.3% (308) 12.6% (387)	7.2% (966) 39.2% (1200)
Micro	0.2% (217) 1.8% (540)	0.2% (288) 2.1% (844)	0.1% (159) 1.2% (295)	0.6% (664) 5.2% (1679)
Total	32.7% (752) 24.2% (957)	29.1% (945) 34.3% (1467)	38.2% (743) 41.5% (853)	100.0% (2440) 100.0% (3277)

SERS U.S. All Company Index Fund Historical Cap/Style Exposures



SERS U.S. All Company Index Fund Historical Style Only Exposures



U.S. Small/Mid Company Stock Idx Fund Period Ended September 30, 2019

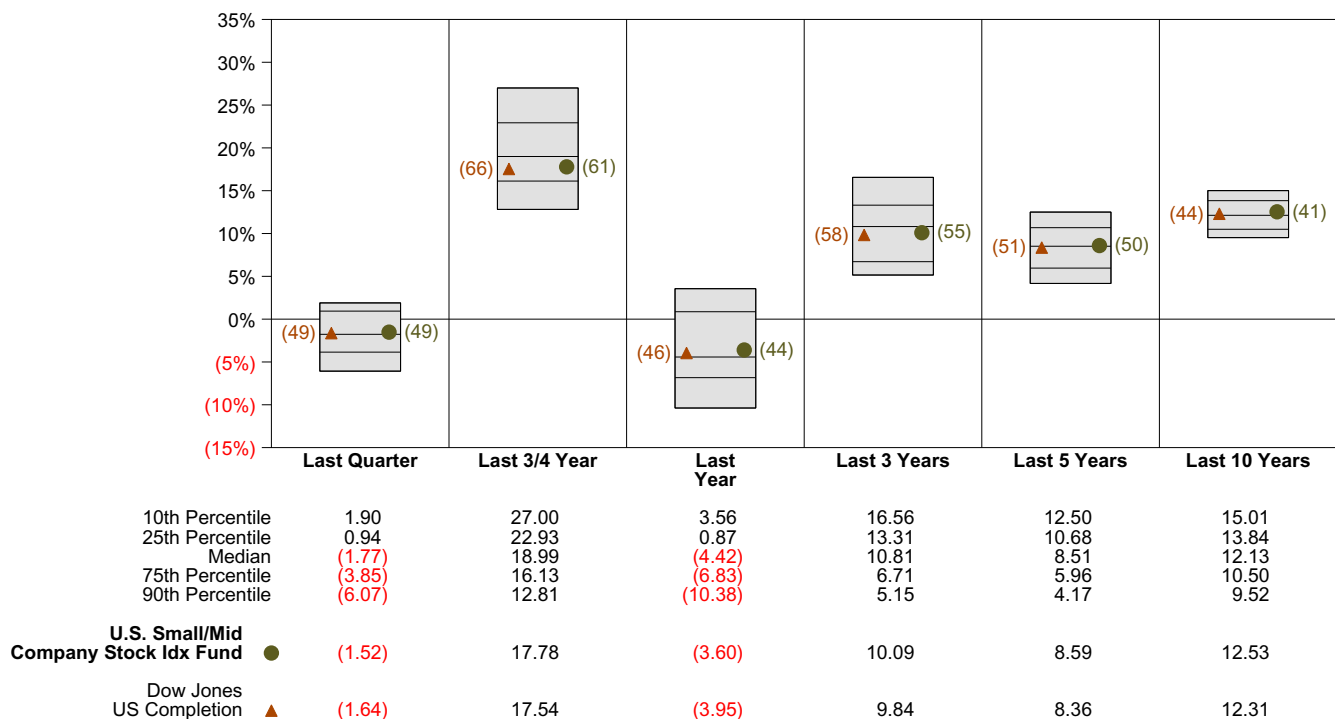
Investment Philosophy

The objective of the U.S. Small/Mid Company Stock Index Fund is to track the performance of the Dow Jones U.S. Completion Total Stock Market Index. In meeting this objective, the Fund may invest in securities, exchange-traded/mutual funds and a combination of other collective funds that together are designed to track the performance of the Dow Jones U.S. Completion Total Stock Market Index. This fund is managed by Mellon Capital Management.

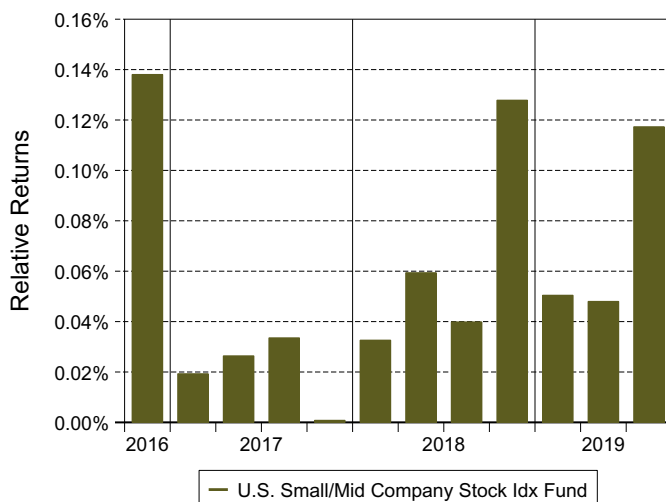
Quarterly Summary and Highlights

- U.S. Small/Mid Company Stock Idx Fund's portfolio posted a (1.52)% return for the quarter placing it in the 49 percentile of the Callan Small/MidCap Broad Mutual Funds group for the quarter and in the 44 percentile for the last year.
- U.S. Small/Mid Company Stock Idx Fund's portfolio outperformed the Dow Jones US Completion by 0.12% for the quarter and outperformed the Dow Jones US Completion for the year by 0.35%.

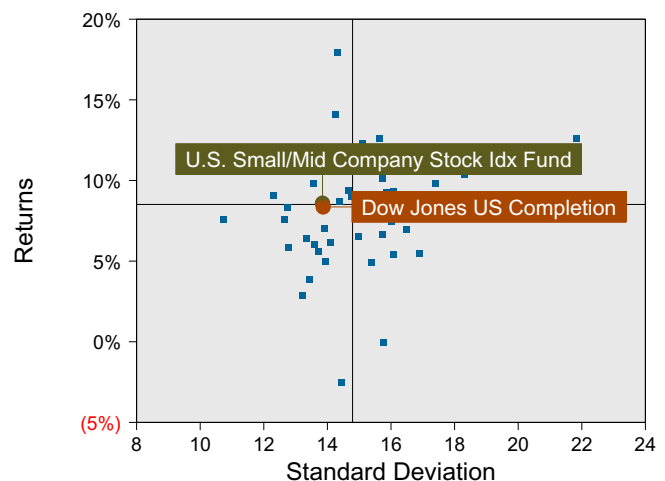
Performance vs Callan Small/MidCap Broad Mutual Funds (Institutional Net)



Relative Return vs Dow Jones US Completion



Callan Small/MidCap Broad Mutual Funds (Institutional Net) Annualized Five Year Risk vs Return

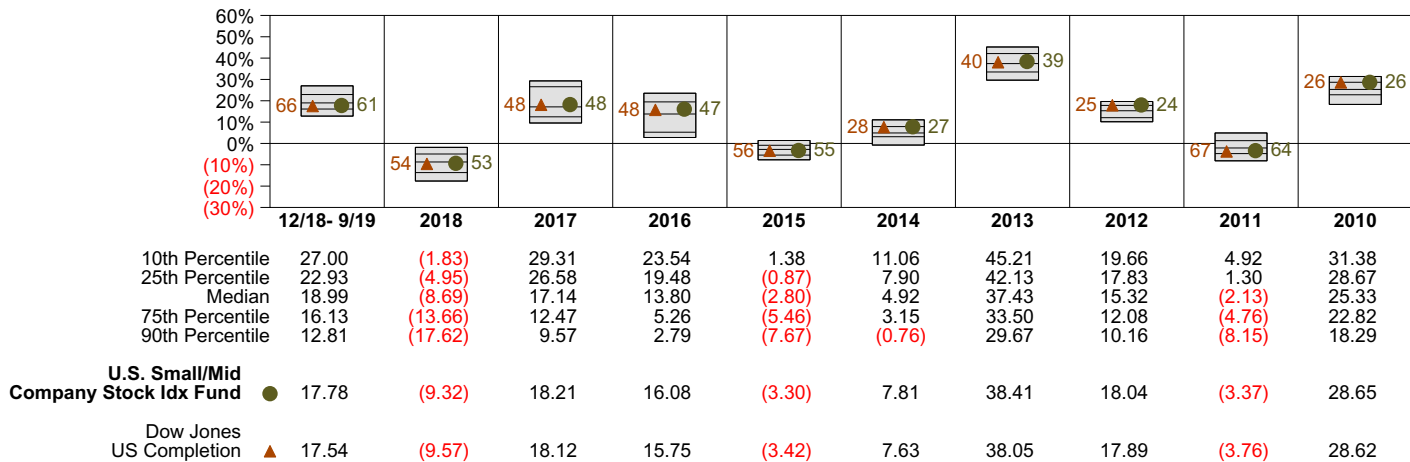


U.S. Small/Mid Company Stock Idx Fund Return Analysis Summary

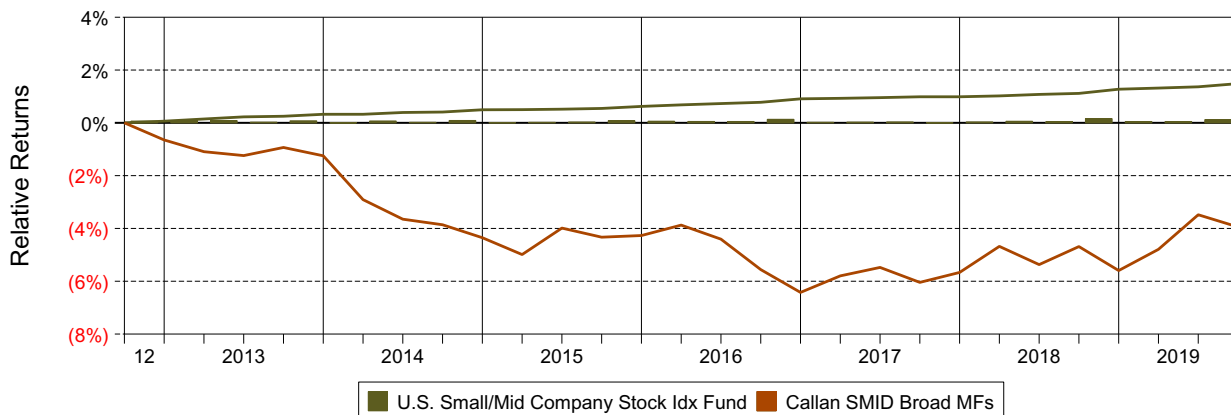
Return Analysis

The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate market benchmark. The last chart illustrates the manager's ranking relative to their style using various risk-adjusted return measures.

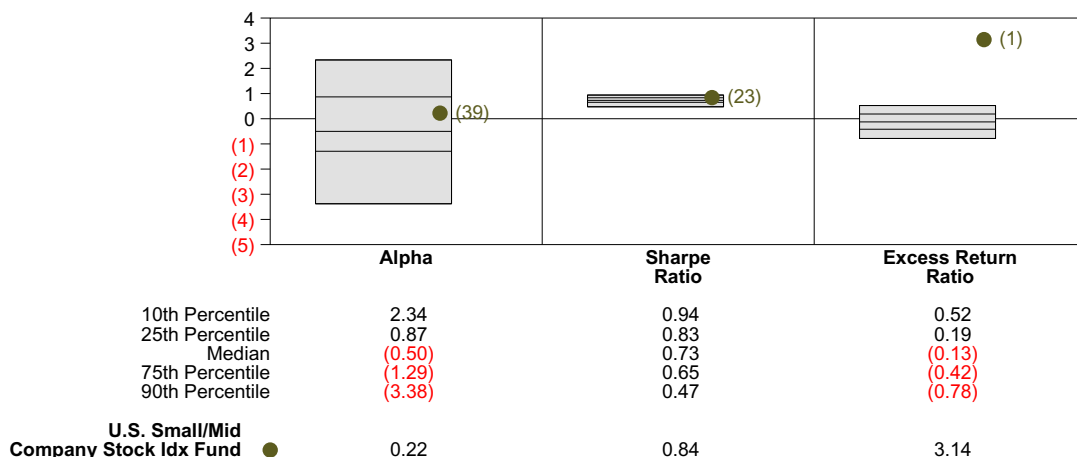
Performance vs Callan Small/MidCap Broad Mutual Funds (Institutional Net)



Cumulative and Quarterly Relative Return vs Dow Jones US Completion



Risk Adjusted Return Measures vs Dow Jones US Completion Rankings Against Callan Small/MidCap Broad Mutual Funds (Institutional Net) Seven Years Ended September 30, 2019



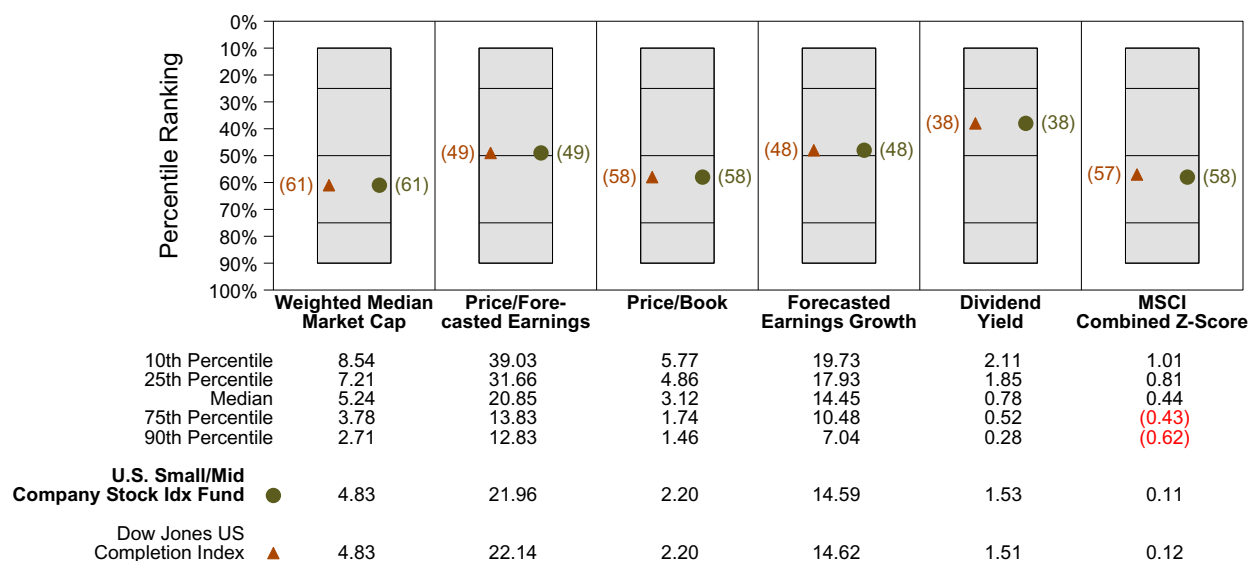
U.S. Small/Mid Company Stock Idx Fund

Equity Characteristics Analysis Summary

Portfolio Characteristics

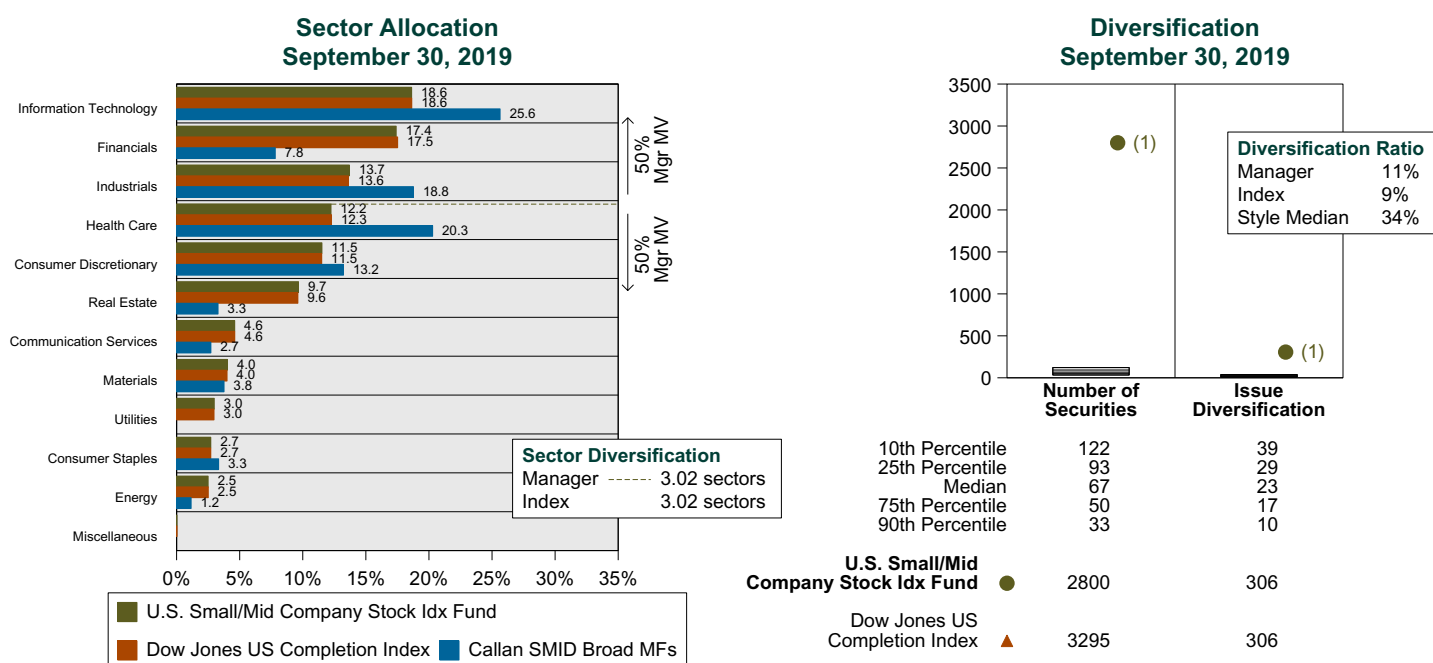
This graph compares the manager's portfolio characteristics with the range of characteristics for the portfolios which make up the manager's style group. This analysis illustrates whether the manager's current holdings are consistent with other managers employing the same style.

Portfolio Characteristics Percentile Rankings Rankings Against Callan Small/MidCap Broad Mutual Funds as of September 30, 2019



Sector Weights

The graph below contrasts the manager's sector weights with those of the benchmark and median sector weights across the members of the peer group. The magnitude of sector weight differences from the index and the manager's sector diversification are also shown. Diversification by number and concentration of holdings are also compared to the benchmark and peer group. Issue Diversification represents by count, and Diversification Ratio by percent, the number of holdings that account for half of the portfolio's market value.



U.S. Small/Mid Company Stock Idx Fund

Top 10 Portfolio Holdings Characteristics

as of September 30, 2019

10 Largest Holdings

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Servicenow Inc	Information Technology	\$158	1.0%	(7.55)%	47.60	63.08	0.00%	33.35%
Tesla Mtrs Inc	Consumer Discretionary	\$113	0.7%	7.79%	43.15	115.30	0.00%	-
Blackstone Group Inc Com Cl A	Financials	\$107	0.7%	11.02%	32.30	16.98	5.43%	19.43%
Workday Inc Cl A	Information Technology	\$91	0.6%	(17.33)%	27.87	83.11	0.00%	28.30%
Costar Group Inc	Industrials	\$72	0.4%	7.06%	21.68	51.20	0.00%	41.67%
Lululemon Athletica Inc	Consumer Discretionary	\$71	0.4%	6.84%	23.71	36.14	0.00%	19.25%
Square Inc Cl A	Information Technology	\$70	0.4%	(14.59)%	21.23	60.68	0.00%	48.60%
Veeva Sys Inc Cl A Com	Health Care	\$66	0.4%	(5.81)%	20.09	65.73	0.00%	19.00%
Las Vegas Sands Corp	Consumer Discretionary	\$65	0.4%	(0.98)%	44.46	17.46	5.33%	2.50%
Palo Alto Networks Inc	Information Technology	\$65	0.4%	0.03%	19.77	38.70	0.00%	16.75%

10 Best Performers

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Durect Corp	Health Care	\$1	0.0%	182.21%	0.35	(14.60)	0.00%	-
Cim Coml Tr Corp	Financials	\$0	0.0%	177.09%	0.23	0.71	1.48%	159.32%
Impac Mtg Hldgs Inc	Financials	\$0	0.0%	153.87%	0.17	35.77	0.00%	(40.54)%
Hovnanian Enterprises Inc Cl A New	Consumer Discretionary	\$0	0.0%	153.29%	0.10	11.48	0.00%	(32.61)%
Stage Stores Inc	Consumer Discretionary	\$0	0.0%	144.16%	0.05	(0.68)	10.64%	-
Xpel Inc	Consumer Staples	\$0	0.0%	118.15%	0.33	24.95	0.00%	-
Atlanticus Hldgs Corp	Financials	\$0	0.0%	106.17%	0.13	3.51	0.00%	-
Nextcure	Health Care	\$1	0.0%	105.94%	0.70	(15.93)	0.00%	-
Seachange Intl Inc	Information Technology	\$1	0.0%	101.40%	0.11	20.87	0.00%	(23.59)%
Dova Pharmaceuticals Inc	Health Care	\$2	0.0%	98.23%	0.81	(14.41)	0.00%	-

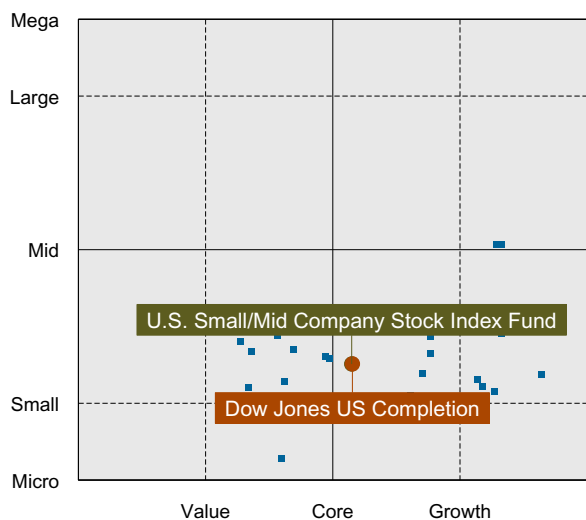
10 Worst Performers

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Genocea Biosciences Inc	Health Care	\$0	0.0%	(90.75)%	0.08	(1.55)	0.00%	-
Tocagen Inc	Health Care	\$0	0.0%	(90.09)%	0.02	(0.34)	0.00%	-
Advaxis Inc	Health Care	\$0	0.0%	(87.27)%	0.01	(0.16)	0.00%	-
Waitr Hldgs Inc	Consumer Discretionary	\$0	0.0%	(79.57)%	0.10	(1.44)	0.00%	(0.46)%
Mcdermott Intl Inc	Energy	\$1	0.0%	(79.09)%	0.37	2.20	0.00%	(5.26)%
Synlogic Inc	Health Care	\$0	0.0%	(74.84)%	0.07	(1.21)	0.00%	-
Mallinckrodt	Health Care	\$1	0.0%	(73.75)%	0.20	0.31	0.00%	(9.60)%
Clovis Oncology Inc	Health Care	\$1	0.0%	(73.57)%	0.21	(0.63)	0.00%	33.70%
Bloom Energy Corp Com Cl A	Industrials	\$0	0.0%	(73.51)%	0.23	(13.49)	0.00%	25.00%
Chaparral Energy Inc Com Cl A	Energy	\$0	0.0%	(71.55)%	0.06	(6.91)	0.00%	-

Historical Holdings Based Style Analysis U.S. Small/Mid Company Stock Index Fund For Three Years Ended September 30, 2019

This page analyzes the historical investment style of a portfolio utilizing a detailed holdings-based style analysis to determine average actual exposures to various market capitalization and style segments of the domestic equity market. The market is segmented quarterly by capitalization and style. The capitalization segments are dictated by capitalization decile breakpoints. The style segments are determined using the "Combined Z Score", based on the eight fundamental factors used in the MSCI stock style scoring system. The upper-left style map illustrates the average historical market capitalization and style score of the portfolio relative to indices and/or peers. The upper-right style exposure matrix displays the average historical portfolio and index weights and stock counts (in parentheses) in each capitalization/style segment of the market. The next two style exposure charts illustrate the actual quarterly cap/style and style only segment exposures of the portfolio through history.

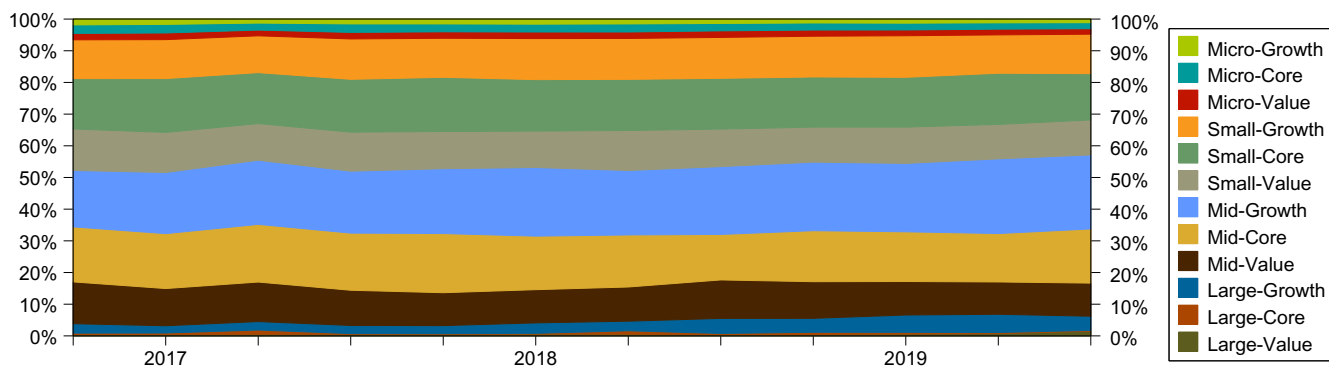
**Average Style Map vs Callan SMID Broad MFs
Holdings for Three Years Ended September 30, 2019**



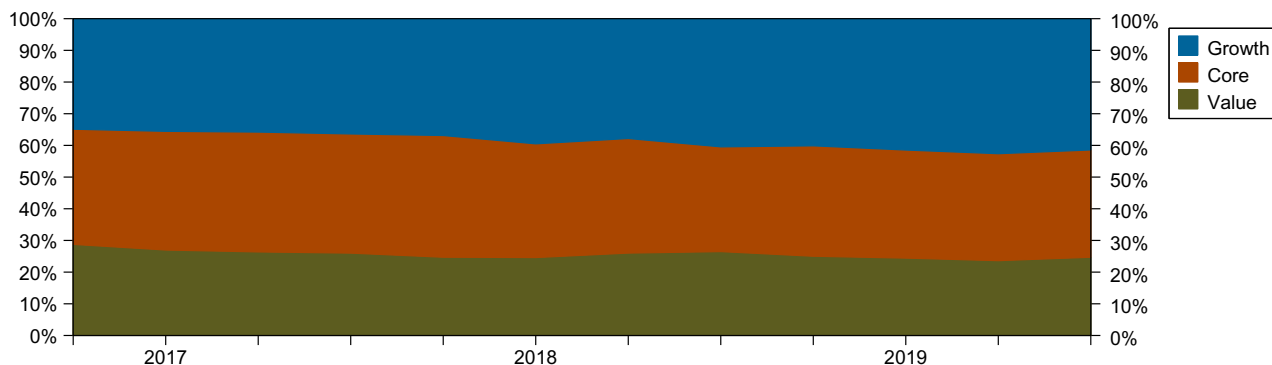
**Average Style Exposure Matrix
Holdings for Three Years Ended September 30, 2019**

	Value	Core	Growth	Total
Large	0.6% (2) 0.6% (2)	0.5% (3) 0.4% (2)	3.7% (8) 3.6% (8)	4.8% (13) 4.7% (12)
Mid	11.3% (94) 11.3% (94)	16.8% (136) 16.8% (137)	20.9% (153) 20.9% (153)	49.0% (383) 49.0% (384)
Small	11.8% (327) 11.7% (328)	16.1% (481) 16.1% (484)	12.5% (376) 12.6% (378)	40.5% (1184) 40.5% (1190)
Micro	2.0% (435) 1.9% (523)	2.4% (652) 2.5% (869)	1.4% (267) 1.4% (304)	5.8% (1354) 5.8% (1696)
Total	25.6% (858) 25.5% (947)	35.8% (1272) 35.9% (1492)	38.6% (804) 38.6% (843)	100.0% (2934) 100.0% (3282)

U.S. Small/Mid Company Stock Index Fund Historical Cap/Style Exposures



U.S. Small/Mid Company Stock Index Fund Historical Style Only Exposures



SERS Global Non-U.S. Index Fund

Period Ended September 30, 2019

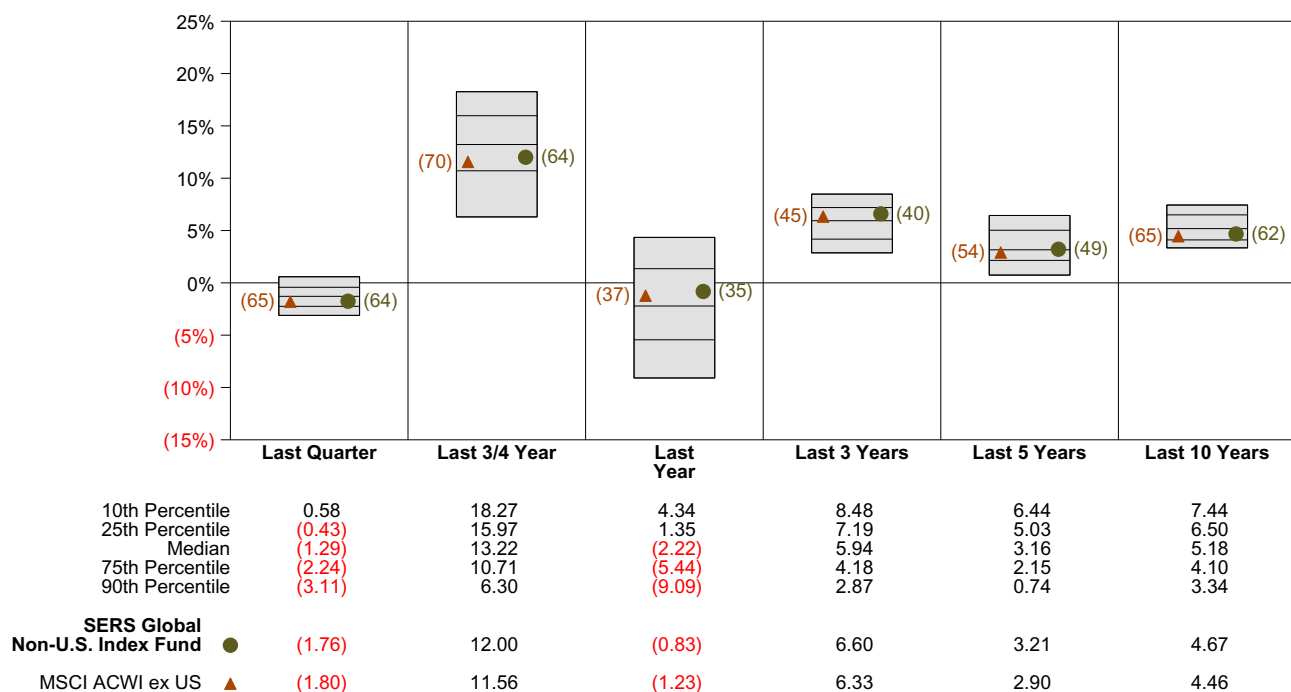
Investment Philosophy

The Global Non-U.S. Stock Index Fund Fund seeks to track the performance of the MSCI All Country World Index (ACWI) ex-U.S. Index. In meeting this objective, the assets of the Fund may be invested in securities, and a combination of other collective funds that are designed to track the performance of such Index. The Fund will principally invest in a combination of other affiliated bank collective funds, equity securities and derivatives, including common stock of foreign companies, depository receipts, financial futures and over-the-counter derivatives that represent developed and emerging market equity securities. This fund is managed by Mellon Capital Management.

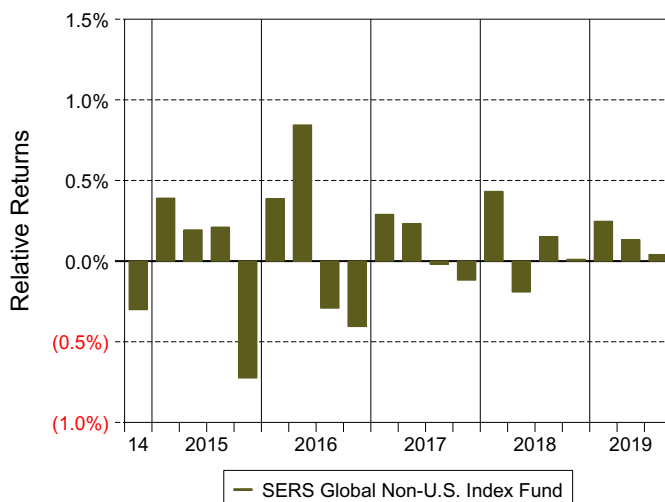
Quarterly Summary and Highlights

- SERS Global Non-U.S. Index Fund's portfolio posted a (1.76)% return for the quarter placing it in the 64 percentile of the Callan Non US Equity Mutual Funds group for the quarter and in the 35 percentile for the last year.
- SERS Global Non-U.S. Index Fund's portfolio outperformed the MSCI ACWI ex US by 0.04% for the quarter and outperformed the MSCI ACWI ex US for the year by 0.40%.

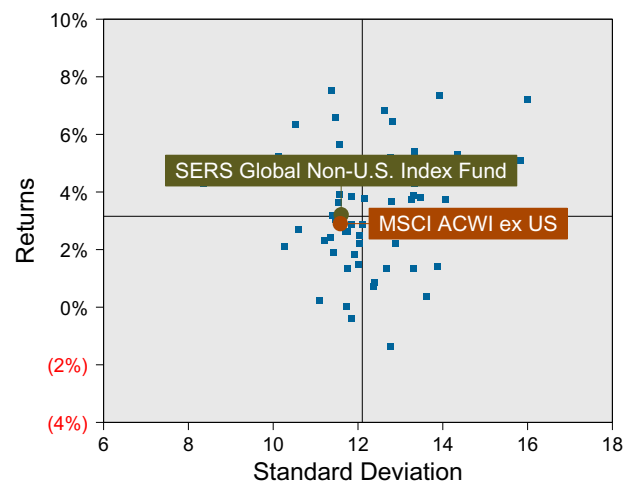
Performance vs Callan Non US Equity Mutual Funds (Institutional Net)



Relative Return vs MSCI ACWI ex US



Callan Non US Equity Mutual Funds (Institutional Net) Annualized Five Year Risk vs Return

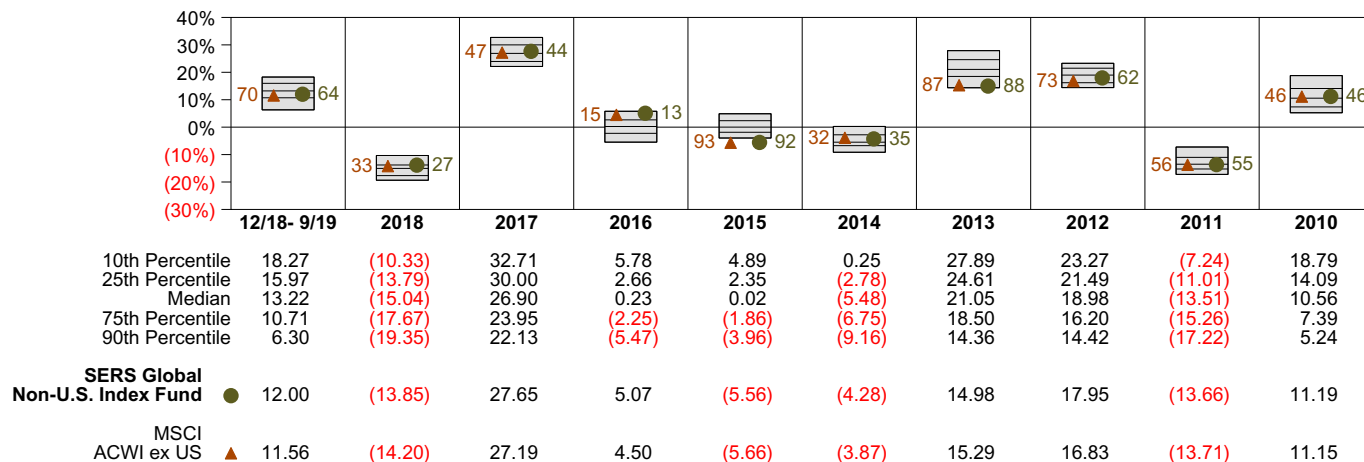


SERS Global Non-U.S. Index Fund Return Analysis Summary

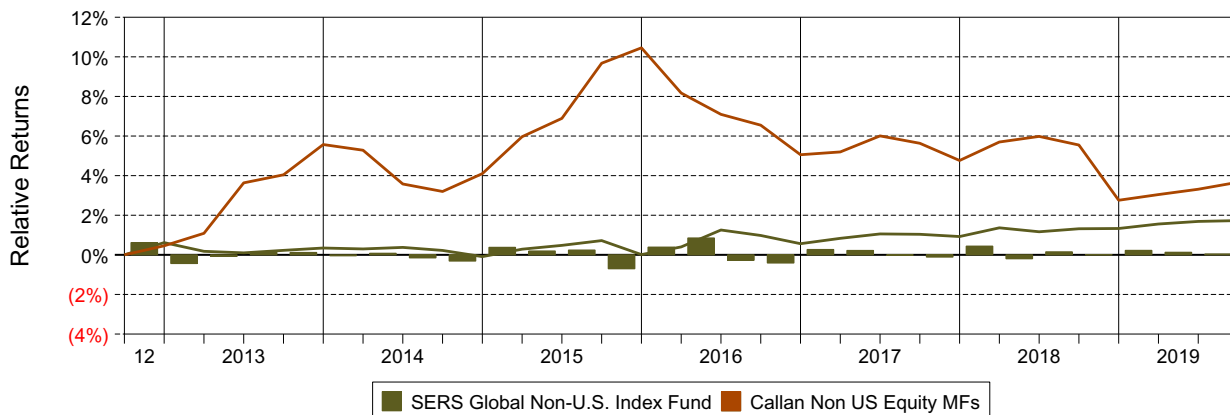
Return Analysis

The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate market benchmark. The last chart illustrates the manager's ranking relative to their style using various risk-adjusted return measures.

Performance vs Callan Non US Equity Mutual Funds (Institutional Net)

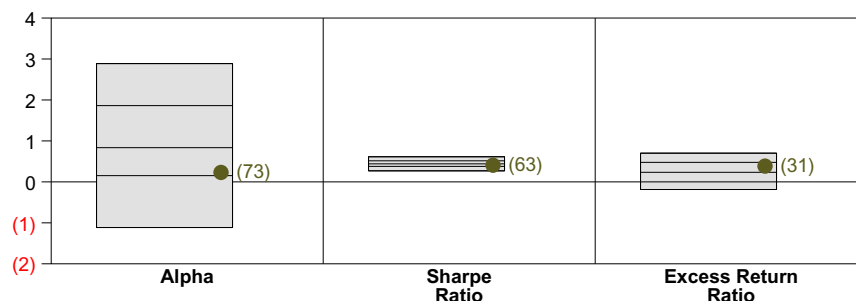


Cumulative and Quarterly Relative Return vs MSCI ACWI ex US



Risk Adjusted Return Measures vs MSCI ACWI ex US

Rankings Against Callan Non US Equity Mutual Funds (Institutional Net) Seven Years Ended September 30, 2019



10th Percentile	2.89	0.61	0.70
25th Percentile	1.86	0.51	0.48
Median	0.84	0.44	0.23
75th Percentile	0.15	0.38	0.00
90th Percentile	(1.11)	0.27	(0.19)

SERS Global Non-U.S. Index Fund	0.23	0.41	0.38
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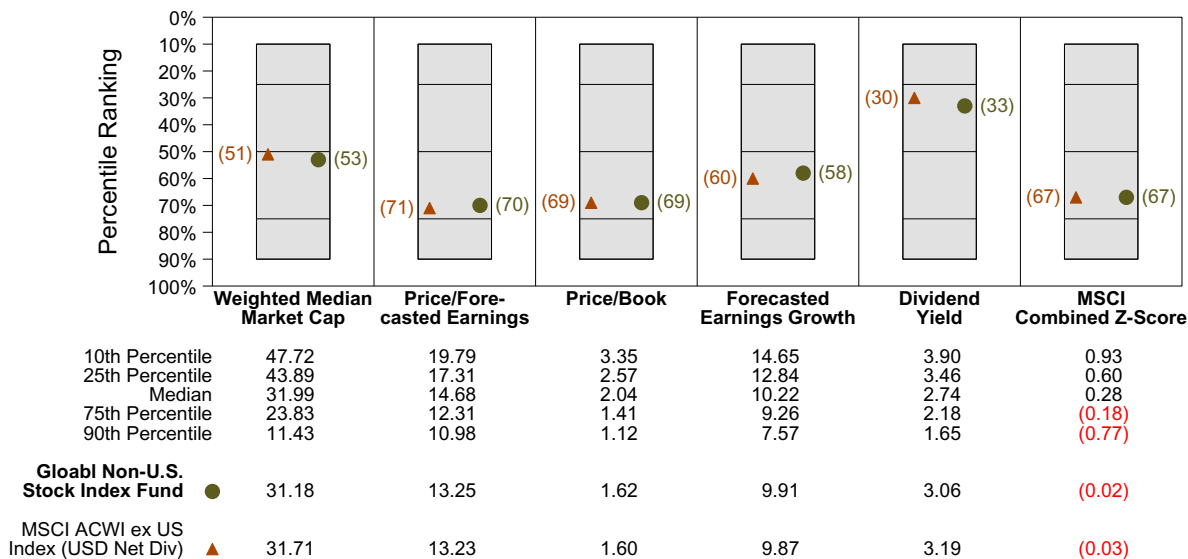
Gloabl Non-U.S. Stock Index Fund

Equity Characteristics Analysis Summary

Portfolio Characteristics

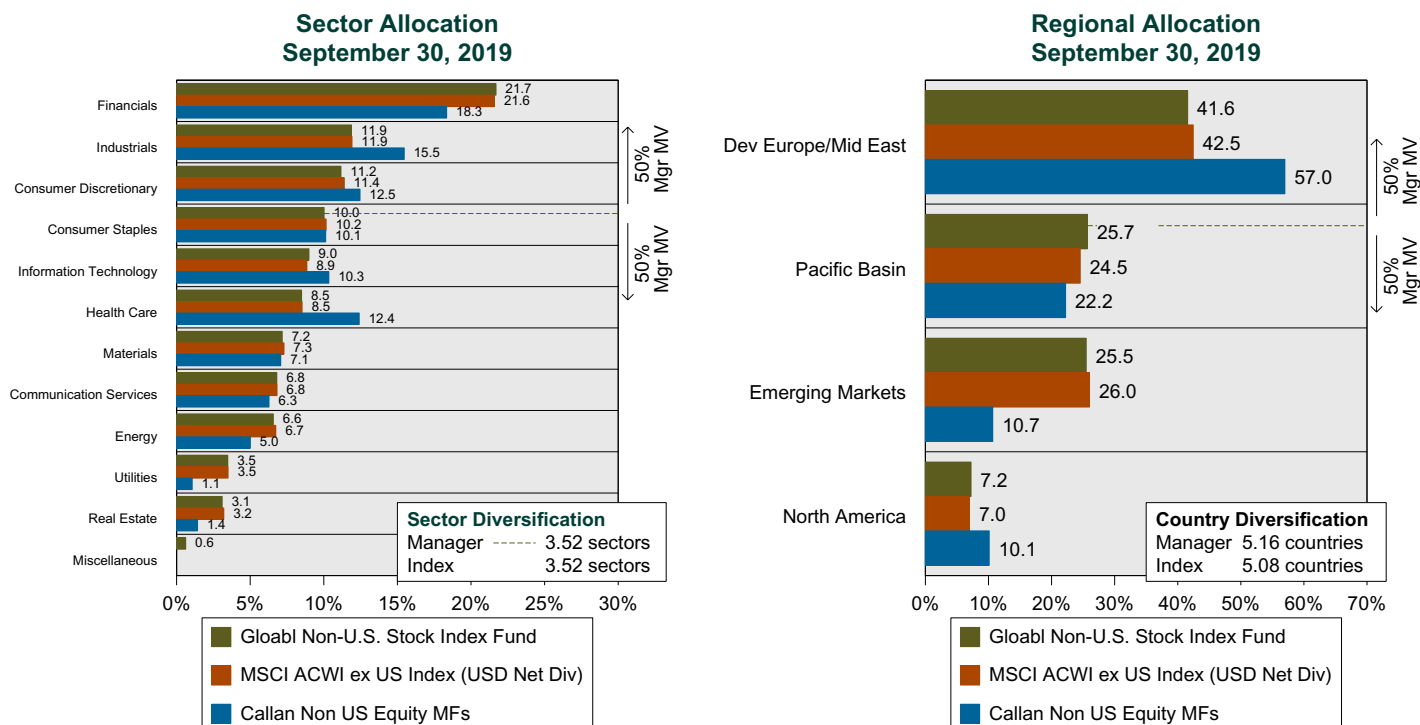
This graph compares the manager's portfolio characteristics with the range of characteristics for the portfolios which make up the manager's style group. This analysis illustrates whether the manager's current holdings are consistent with other managers employing the same style.

Portfolio Characteristics Percentile Rankings Rankings Against Callan Non US Equity Mutual Funds as of September 30, 2019



Sector Weights

The graph below contrasts the manager's sector weights with those of the benchmark and median sector weights across the members of the peer group. The magnitude of sector weight differences from the index and the manager's sector diversification are also shown. The regional allocation chart compares the manager's geographical region weights with those of the benchmark as well as the median region weights of the peer group.



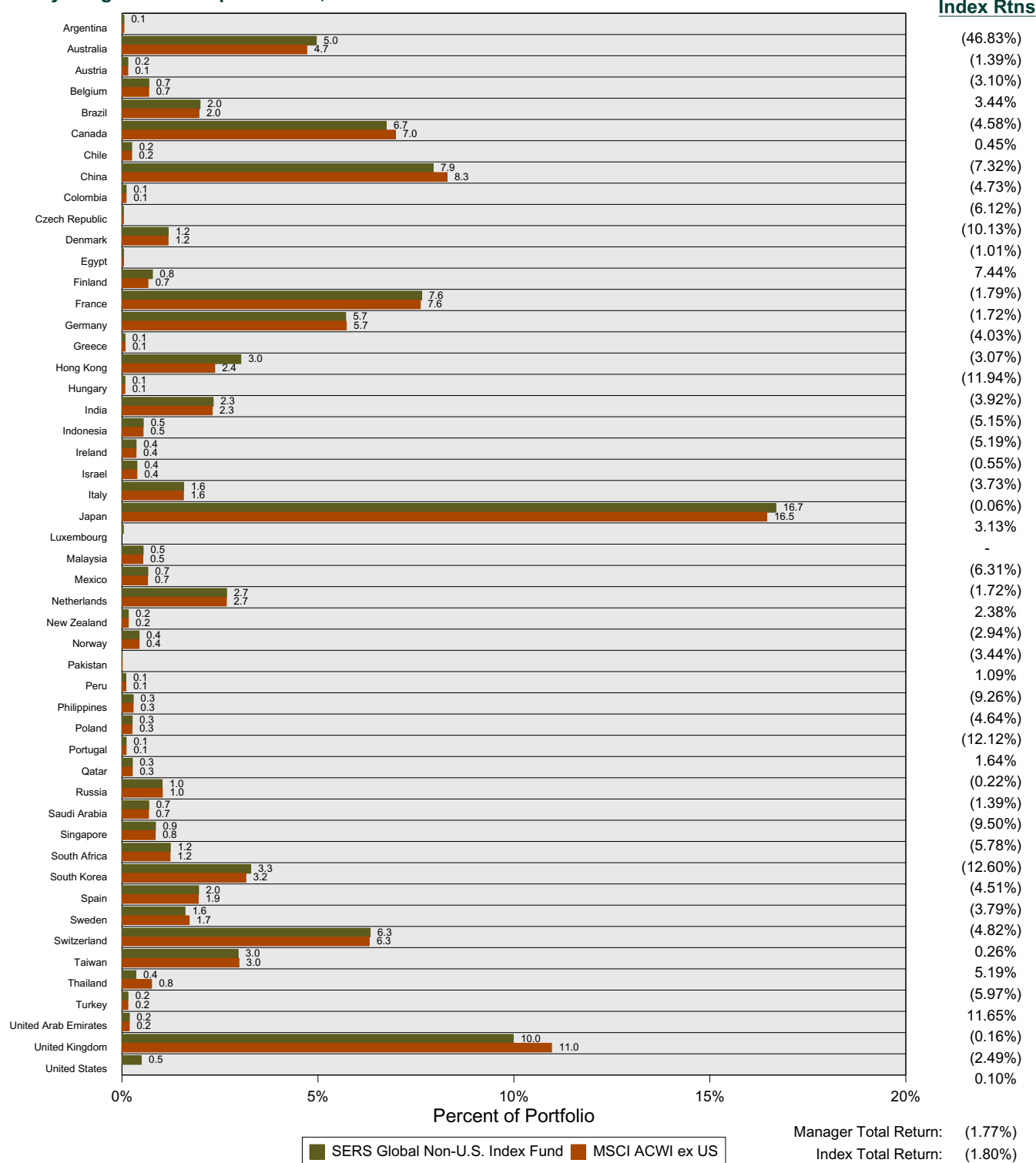
Country Allocation

SERS Global Non-U.S. Index Fund VS MSCI ACWI ex US Index (USD Net Div)

Country Allocation

The chart below contrasts the portfolio's country allocation with that of the index as of September 30, 2019. This chart is useful because large deviations in country allocation relative to the index are often good predictors of tracking error in the subsequent quarter. To the extent that the portfolio allocation is similar to the index, the portfolio should experience more "index-like" performance. In order to illustrate the performance effect on the portfolio and index of these country allocations, the individual index country returns are also shown.

Country Weights as of September 30, 2019



SERS Global Non-U.S. Index Fund

Top 10 Portfolio Holdings Characteristics

as of September 30, 2019

10 Largest Holdings

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Nestle S A Shs Nom New	Consumer Staples	\$2,508	1.6%	4.76%	323.16	23.06	2.26%	8.73%
Tencent Holdings Limited Shs Par Hkd	Communication Services	\$1,938	1.2%	(6.67)%	402.38	26.00	0.30%	24.61%
Alibaba Group Hldg Ltd Sponsored Ads	Consumer Discretionary	\$1,915	1.2%	(1.31)%	435.39	21.60	0.00%	28.00%
Taiwan Semicond Manufac Co L Shs	Information Technology	\$1,649	1.1%	14.79%	227.34	18.74	3.13%	7.27%
Roche Hldgs Ag Basel Div Rts Ctf	Health Care	\$1,543	1.0%	3.40%	204.64	14.87	2.86%	6.00%
Samsung Electronics Co Ltd Ord	Information Technology	\$1,495	1.0%	1.51%	244.80	12.84	2.89%	18.69%
Novartis	Health Care	\$1,406	0.9%	(5.14)%	219.34	15.65	3.29%	6.66%
Hsbc Holdings (Gb)	Financials	\$1,174	0.8%	(6.65)%	155.94	10.62	6.37%	1.52%
Toyota Motor Corp	Consumer Discretionary	\$1,166	0.7%	7.57%	217.87	8.93	3.05%	12.29%
Bp Plc Shs	Energy	\$975	0.6%	(7.45)%	129.88	11.30	6.24%	10.50%

10 Best Performers

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Barito Pacific Timber	Materials	\$14	0.0%	100.00%	6.21	70.00	0.29%	(32.73)%
Banco Espirito Santo E Comer Ord	Financials	\$0	0.0%	100.00%	0.00	-	0.00%	-
Goertek 'a'	Information Technology	\$1	0.0%	90.27%	7.99	36.18	0.57%	34.25%
Advantest Corp Ord	Information Technology	\$67	0.0%	60.63%	8.82	23.08	1.93%	(21.81)%
Bosideng International Hldgs	Consumer Discretionary	\$11	0.0%	56.80%	4.58	23.67	2.39%	12.36%
Pinduoduo Inc Sponsored Ads	Consumer Discretionary	\$50	0.0%	56.18%	20.74	93.66	0.00%	-
Shenzhen O-Film Tech 'a'	Information Technology	\$1	0.0%	46.04%	4.52	14.27	0.00%	29.20%
Nanya Technology Co Ltd Ord	Information Technology	\$24	0.0%	44.44%	7.97	16.93	8.83%	(15.38)%
Win Semiconductors	Information Technology	\$23	0.0%	43.35%	3.81	26.65	1.79%	17.63%
Lens Technology 'a'	Information Technology	\$1	0.0%	42.70%	5.67	22.86	0.24%	53.83%

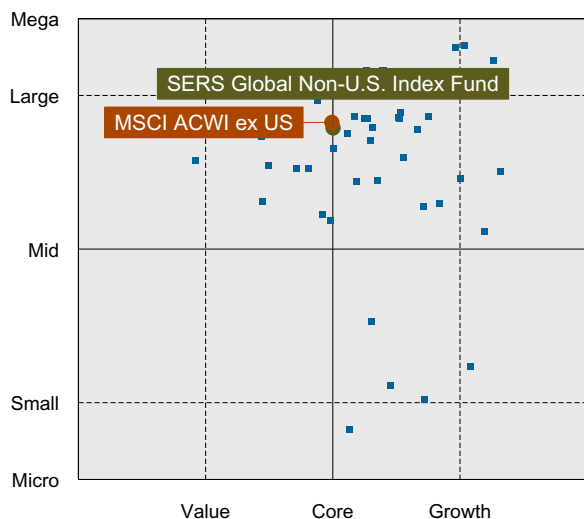
10 Worst Performers

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Sillajen	Health Care	\$3	0.0%	(84.85)%	0.48	(5.64)	0.00%	-
Banco Macro Sa Spon Adr B	Financials	\$9	0.0%	(64.28)%	1.90	3.97	6.02%	16.70%
Grupo Financiero Galicia S A Sp Adr	Financials	\$10	0.0%	(63.38)%	1.63	4.29	1.71%	23.30%
Yes Bank Ltd Shs Dematerial	Financials	\$9	0.0%	(62.93)%	1.49	5.09	4.83%	3.62%
Banco Bbva Argentina Sa Sponsored Ad	Financials	\$3	0.0%	(61.75)%	0.99	2.85	4.20%	42.32%
Indiabulls Financial Service Shs Dem	Financials	\$7	0.0%	(58.44)%	1.54	2.54	14.85%	11.11%
Jastrzebska Spolka Weglowa S	Materials	\$2	0.0%	(54.55)%	0.64	3.23	7.85%	100.08%
Viomed	Health Care	\$8	0.0%	(51.67)%	1.18	(36.21)	0.00%	-
Idea Cellular Ltd	Communication Services	\$5	0.0%	(51.28)%	2.49	(1.17)	9.76%	(15.50)%
Pampa Hldg S A Spons Adr Lvl I	Utilities	\$9	0.0%	(49.93)%	1.45	6.03	0.00%	20.60%

Historical Holdings Based Style Analysis SERS Global Non-U.S. Index Fund For Three Years Ended September 30, 2019

This page analyzes the historical investment style of a portfolio utilizing a detailed holdings-based style analysis to determine average actual exposures to various region and style segments of the international/global equity market. The market is segmented quarterly by region and style. The style segments are determined using the "Combined Z Score", based on the eight fundamental factors used in the MSCI stock style scoring system. The upper-left style map illustrates the average historical market capitalization and style score of the portfolio relative to indices and/or peers. The upper-right style exposure matrix displays the average historical portfolio and index weights and stock counts (in parentheses) in each region/style segment of the market. The next two style exposure charts illustrate the actual quarterly region/style and style only segment exposures of the portfolio through history.

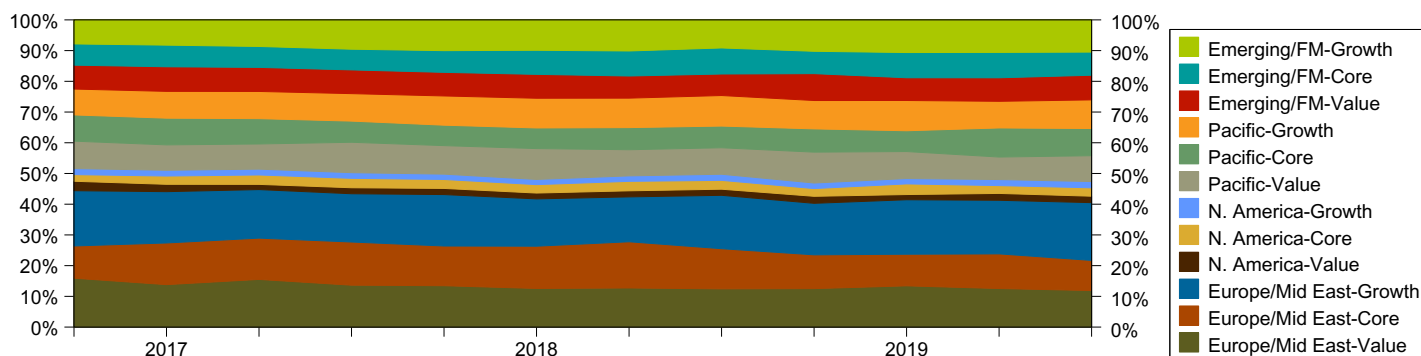
**Average Style Map vs Callan Non US Equity MFs
Holdings for Three Years Ended September 30, 2019**



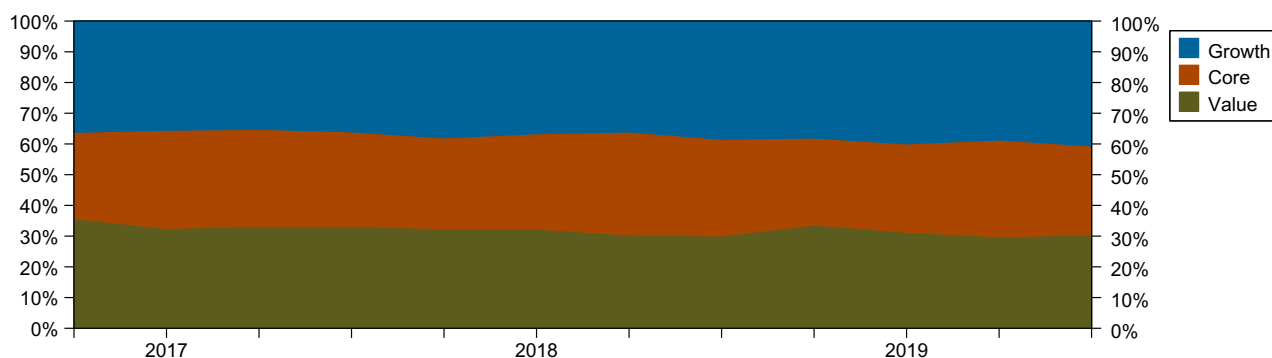
**Average Style Exposure Matrix
Holdings for Three Years Ended September 30, 2019**

	13.4% (127)	12.4% (126)	16.8% (180)	42.5% (433)
Europe/ Mid East	13.5% (134)	12.2% (130)	16.7% (189)	42.4% (453)
N. America	2.1% (30)	2.8% (30)	1.9% (30)	6.8% (90)
	2.1% (31)	2.9% (30)	1.8% (31)	6.8% (92)
Pacific	8.9% (144)	7.7% (151)	9.2% (175)	25.8% (470)
	8.7% (145)	7.4% (150)	8.8% (175)	24.9% (470)
Emerging/ FM	7.7% (329)	7.5% (286)	9.6% (285)	24.9% (900)
	8.1% (357)	7.8% (316)	9.9% (316)	25.9% (989)
Total	32.1% (630)	30.5% (593)	37.5% (670)	100.0% (1893)
	32.4% (667)	30.3% (626)	37.3% (711)	100.0% (2004)
	Value	Core	Growth	Total

SERS Global Non-U.S. Index Fund Historical Region/Style Exposures



SERS Global Non-U.S. Index Fund Historical Style Only Exposures



SERS Short Term Investment Fund Period Ended September 30, 2019

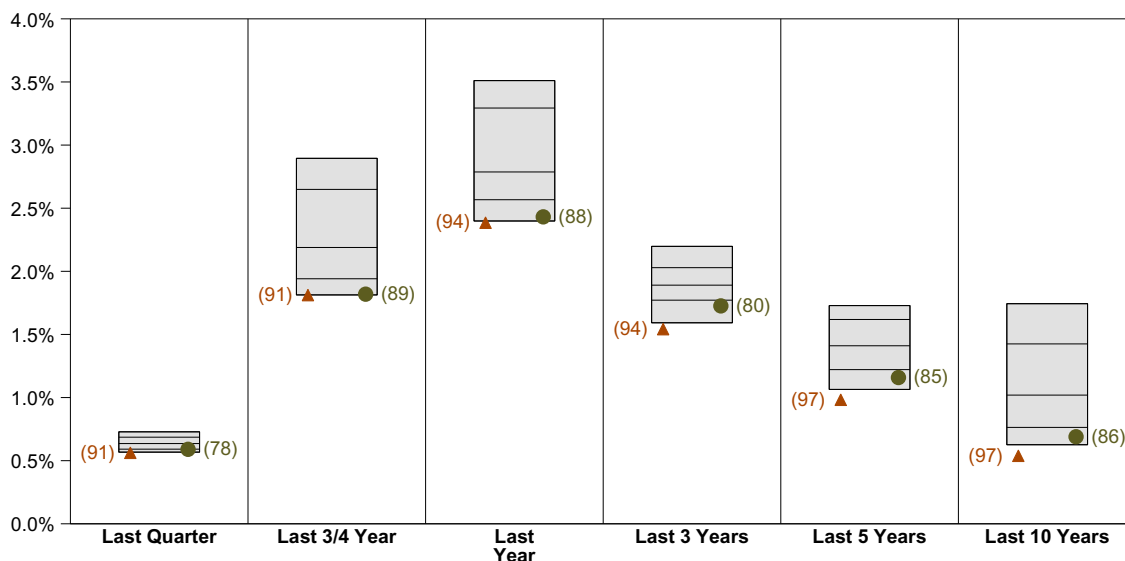
Investment Philosophy

The Short Term Investment Fund seeks to achieve the highest current income consistent with maintaining liquidity and safety of principal. This fund is managed by the Pennsylvania State Treasurer. It is compared against the Callan Cash Database, which includes STIF, enhanced cash, and money market funds.

Quarterly Summary and Highlights

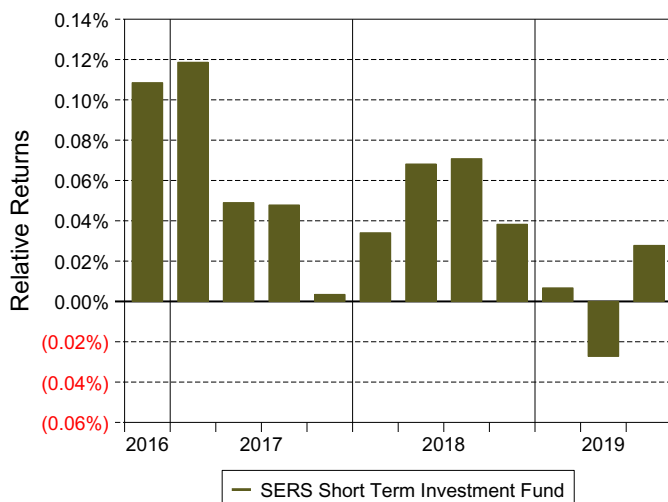
- SERS Short Term Investment Fund's portfolio posted a 0.59% return for the quarter placing it in the 78 percentile of the Callan Cash Database group for the quarter and in the 88 percentile for the last year.
- SERS Short Term Investment Fund's portfolio outperformed the 3-month Treasury Bill by 0.03% for the quarter and outperformed the 3-month Treasury Bill for the year by 0.05%.

Performance vs Callan Cash Database (Gross)

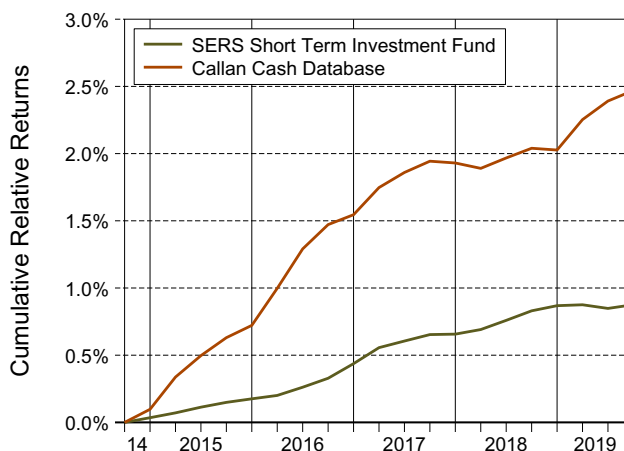


10th Percentile	0.73	2.90	3.51	2.20	1.73	1.74
25th Percentile	0.69	2.65	3.29	2.03	1.62	1.42
Median	0.64	2.19	2.79	1.89	1.41	1.02
75th Percentile	0.59	1.94	2.57	1.77	1.22	0.76
90th Percentile	0.57	1.81	2.40	1.59	1.06	0.63
SERS Short Term Investment Fund	● 0.59	1.82	2.43	1.73	1.16	0.69
3-month Treasury Bill	▲ 0.56	1.81	2.39	1.54	0.98	0.54

Relative Return vs 3-month Treasury Bill



Cumulative Returns vs 3-month Treasury Bill



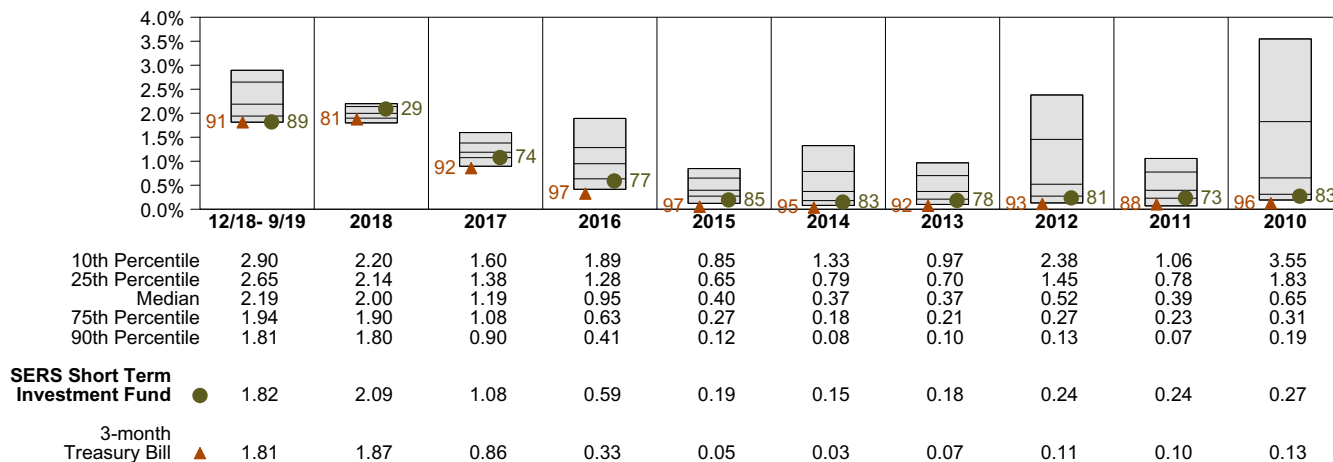
SERS Short Term Investment Fund Return Analysis Summary

Return Analysis

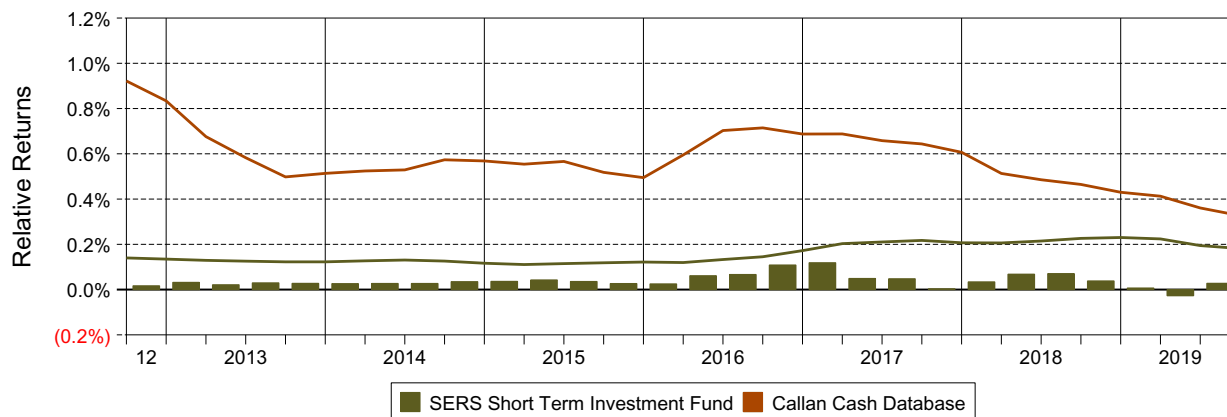
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and 12 quarter rolling manager returns versus the appropriate market benchmark. The last chart illustrates the manager's ranking relative to their style using various risk-adjusted return measures.

Callan Cash Database includes STIF, enhanced cash, and money market funds.

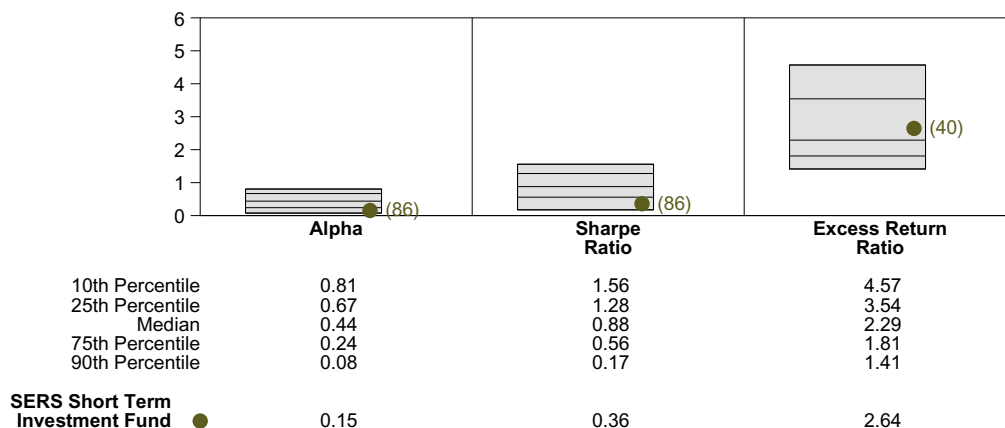
Performance vs Callan Cash Database (Gross)



Rolling 12 Quarter and Quarterly Relative Return vs 3-month Treasury Bill



Risk Adjusted Return Measures vs 3-month Treasury Bill Rankings Against Callan Cash Database (Gross) Seven Years Ended September 30, 2019



SERS U.S. Short Term Bond Idx Fund

Period Ended September 30, 2019

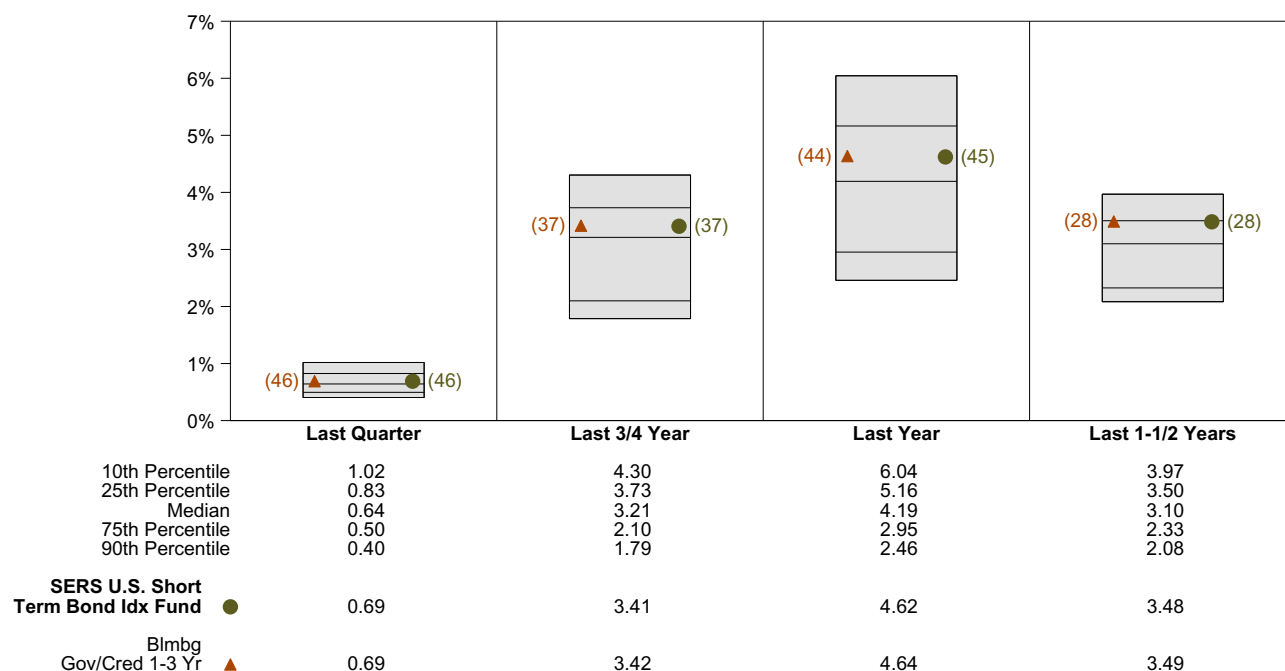
Investment Philosophy

The Fund's investment objective is to seek to track the performance of the Bloomberg Barclays U.S. 1-3 Year Government/Credit Index ("Index"). In meeting this objective, the Fund may invest in securities (including those issued through private placements) and a combination of other collective funds that together are designed to track the performance of the Index. The Fund will principally invest in other affiliated bank collective funds, debt securities of U.S. corporations and the U.S. government, its agencies and instrumentalities, including mortgage-related and asset-backed securities. This fund is managed by Mellon Capital Management.

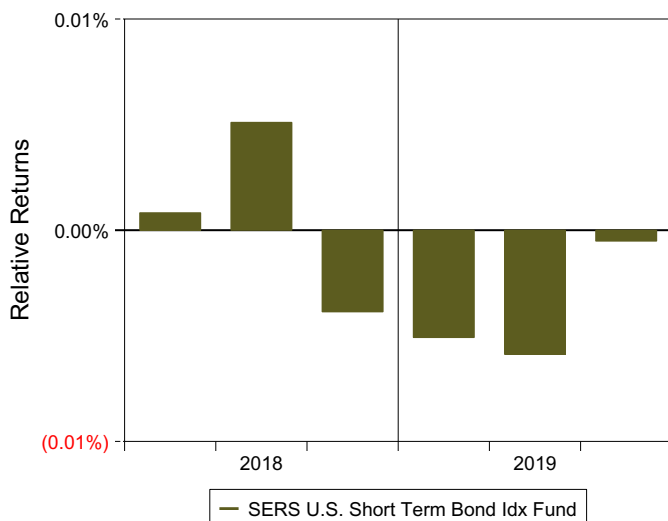
Quarterly Summary and Highlights

- SERS U.S. Short Term Bond Idx Fund's portfolio posted a 0.69% return for the quarter placing it in the 46 percentile of the Callan Short US Gov Bond Mut Funds group for the quarter and in the 45 percentile for the last year.
- SERS U.S. Short Term Bond Idx Fund's portfolio underperformed the Blmbg Gov/Cred 1-3 Yr by 0.00% for the quarter and underperformed the Blmbg Gov/Cred 1-3 Yr for the year by 0.02%.

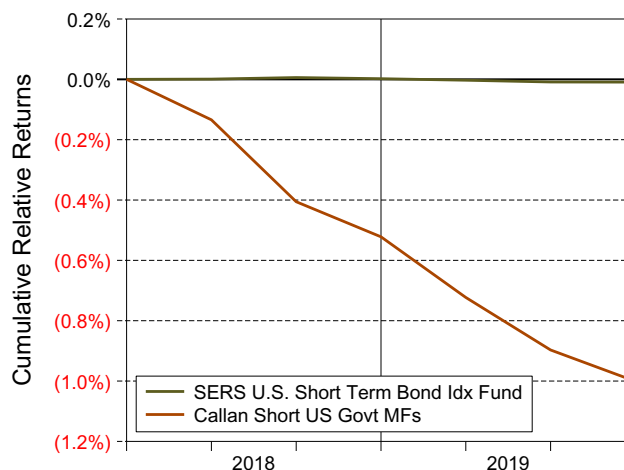
Performance vs Callan Short US Gov Bond Mut Funds (Institutional Net)



Relative Return vs Blmbg Gov/Cred 1-3 Yr



Cumulative Returns vs Blmbg Gov/Cred 1-3 Yr



SERS U.S. Short Term Bond Idx Fund

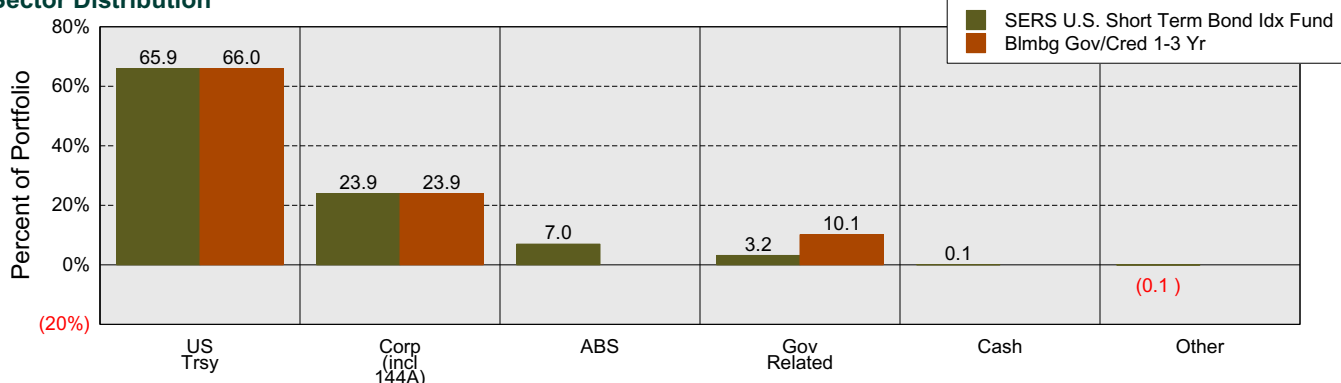
Portfolio Characteristics Summary

As of September 30, 2019

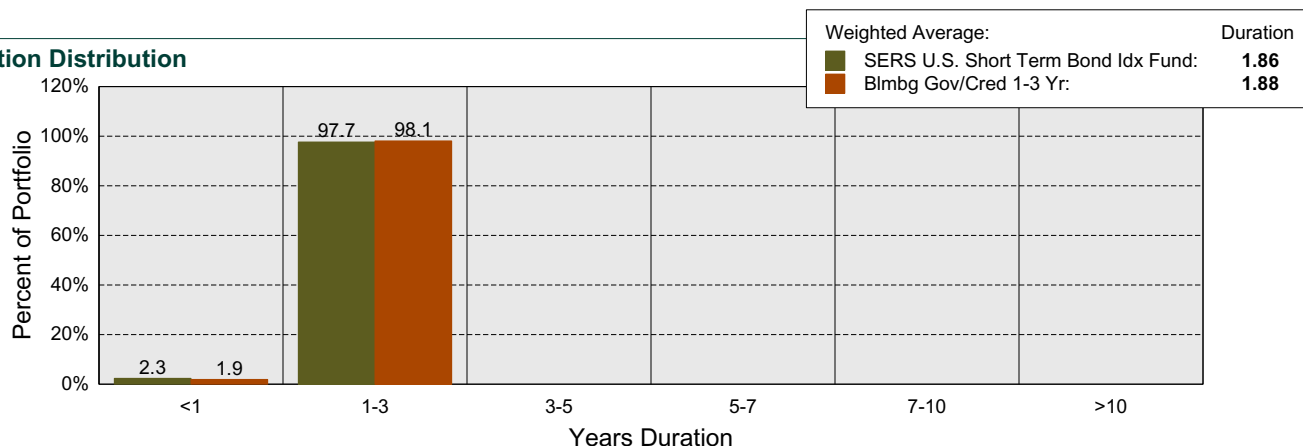
Portfolio Structure Comparison

The charts below compare the structure of the portfolio to that of the index from the three perspectives that have the greatest influence on return. The first chart compares the two portfolios across sectors. The second chart compares the duration distribution. The last chart compares the distribution across quality ratings.

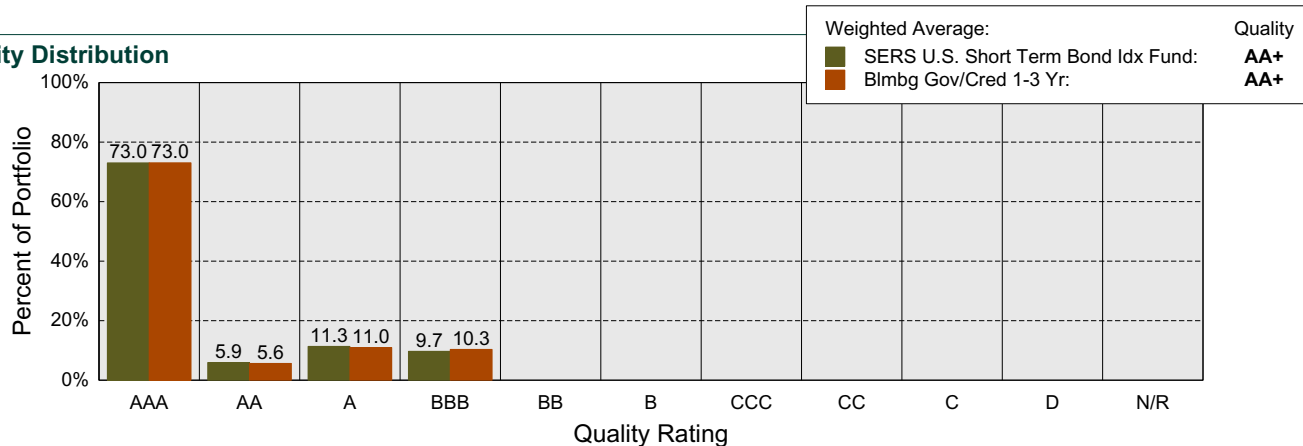
Sector Distribution



Duration Distribution



Quality Distribution



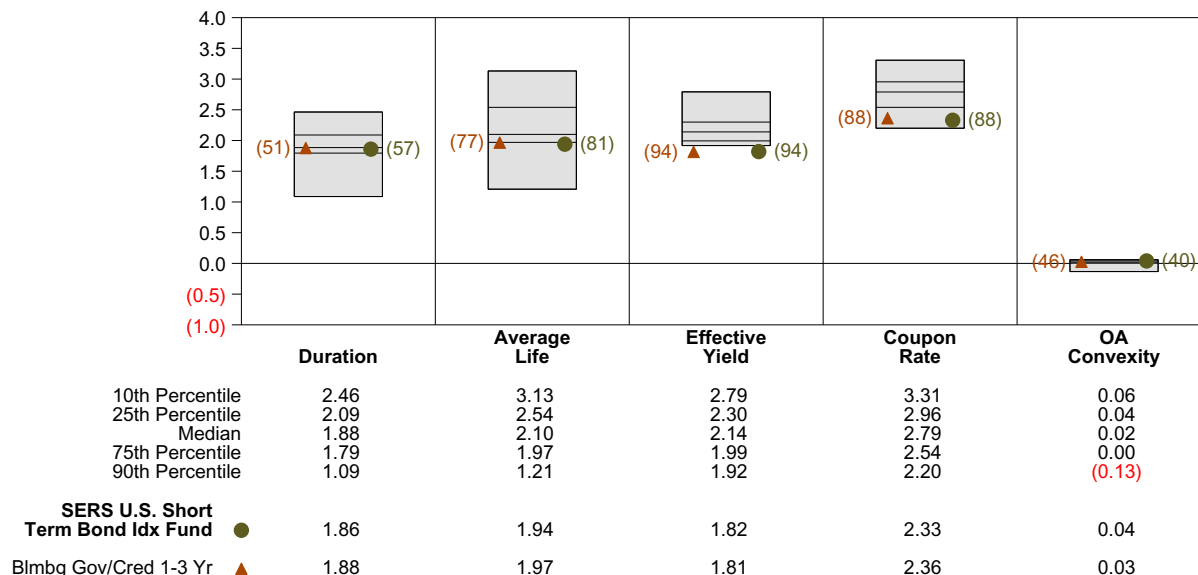
SERS U.S. Short Term Bond Idx Fund

Bond Characteristics Analysis Summary

Portfolio Characteristics

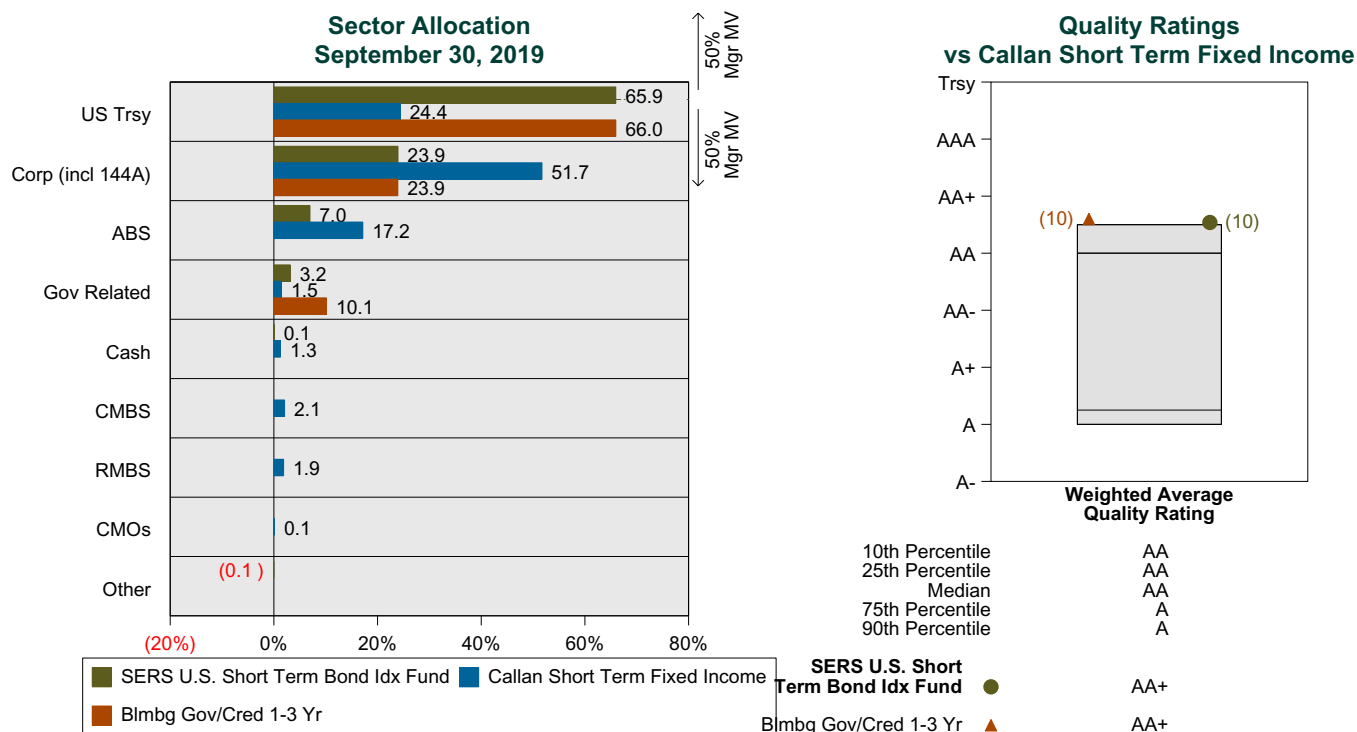
This graph compares the manager's portfolio characteristics with the range of characteristics for the portfolios which make up the manager's style group. This analysis illustrates whether the manager's current holdings are consistent with other managers employing the same style.

Fixed Income Portfolio Characteristics Rankings Against Callan Short Term Fixed Income as of September 30, 2019



Sector Allocation and Quality Ratings

The first graph compares the manager's sector allocation with the average allocation across all the members of the manager's style. The second graph compares the manager's weighted average quality rating with the range of quality ratings for the style.



SERS U.S. TIPS Index Fund

Period Ended September 30, 2019

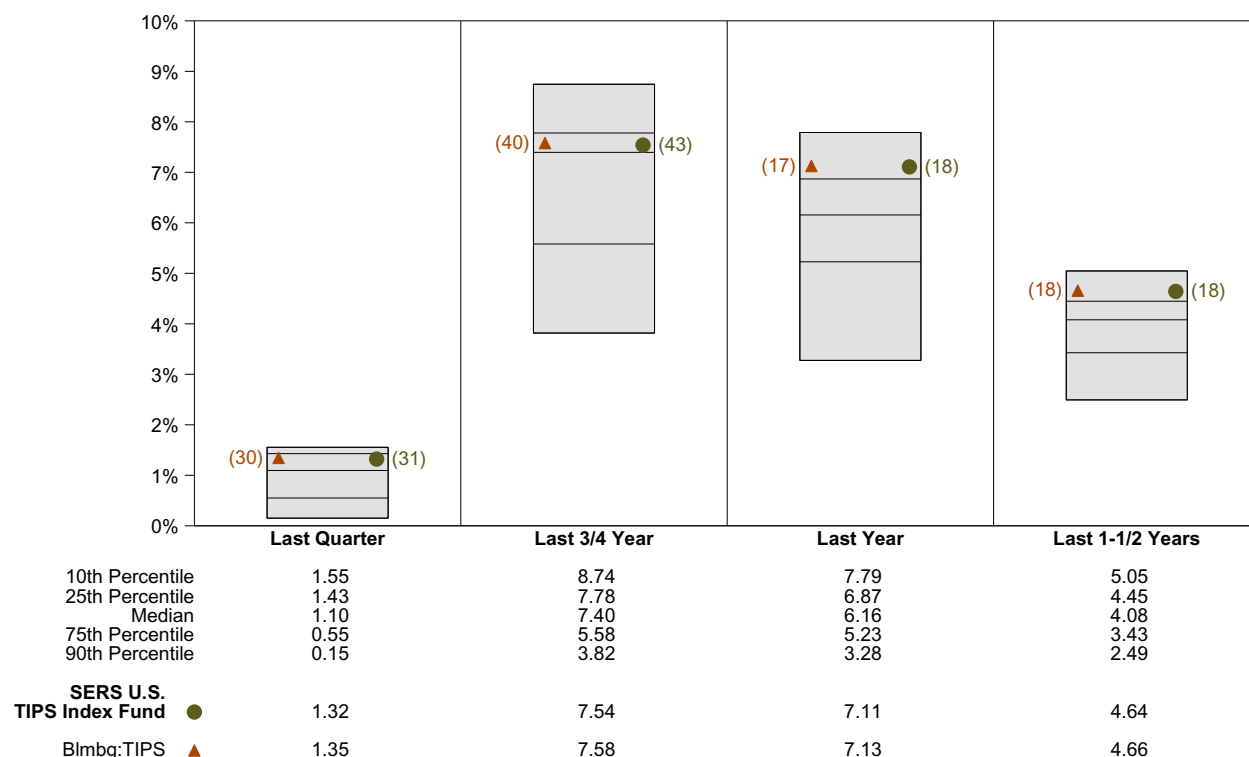
Investment Philosophy

The objective of the U.S. Treasury Inflation Protected Security Index Fund is to track the performance of the U.S. inflation-linked government bond market (otherwise known as Treasury Inflation Protected Securities, or "TIPS"). This fund is managed by Mellon Capital Management.

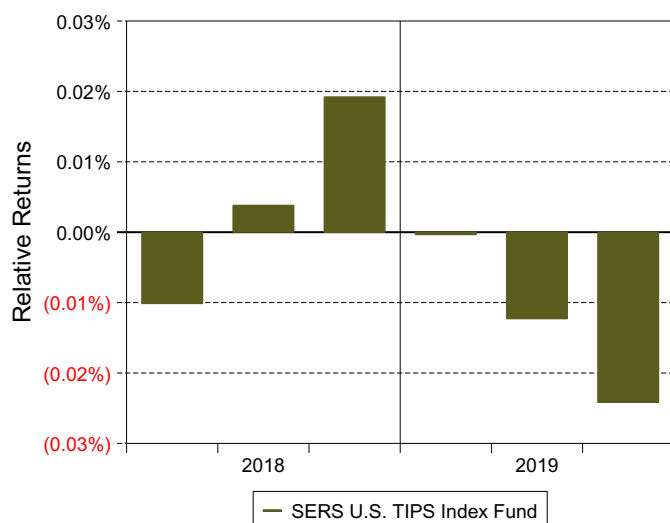
Quarterly Summary and Highlights

- SERS U.S. TIPS Index Fund's portfolio posted a 1.32% return for the quarter placing it in the 31 percentile of the Callan Treas Infl Prot Securities MFs group for the quarter and in the 18 percentile for the last year.
- SERS U.S. TIPS Index Fund's portfolio underperformed the Blmbg:TIPS by 0.02% for the quarter and underperformed the Blmbg:TIPS for the year by 0.02%.

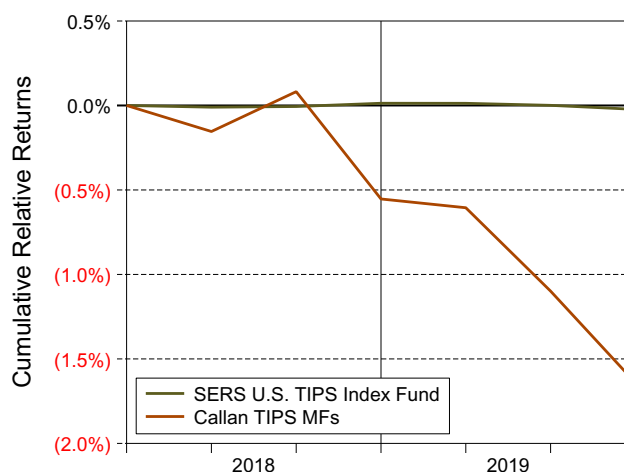
Performance vs Callan Treas Infl Prot Securities MFs (Institutional Net)



Relative Return vs Blmbg:TIPS



Cumulative Returns vs Blmbg:TIPS



SERS U.S. TIPS Index Fund

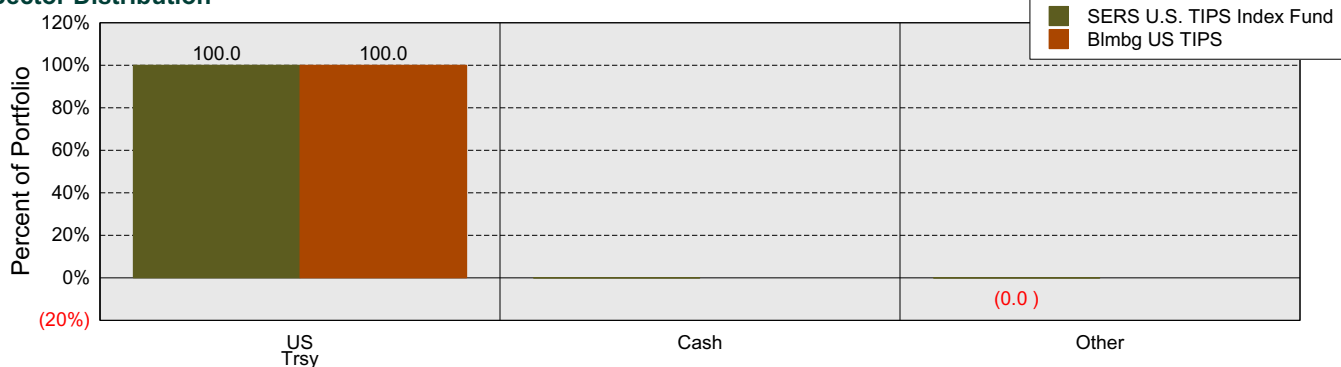
Portfolio Characteristics Summary

As of September 30, 2019

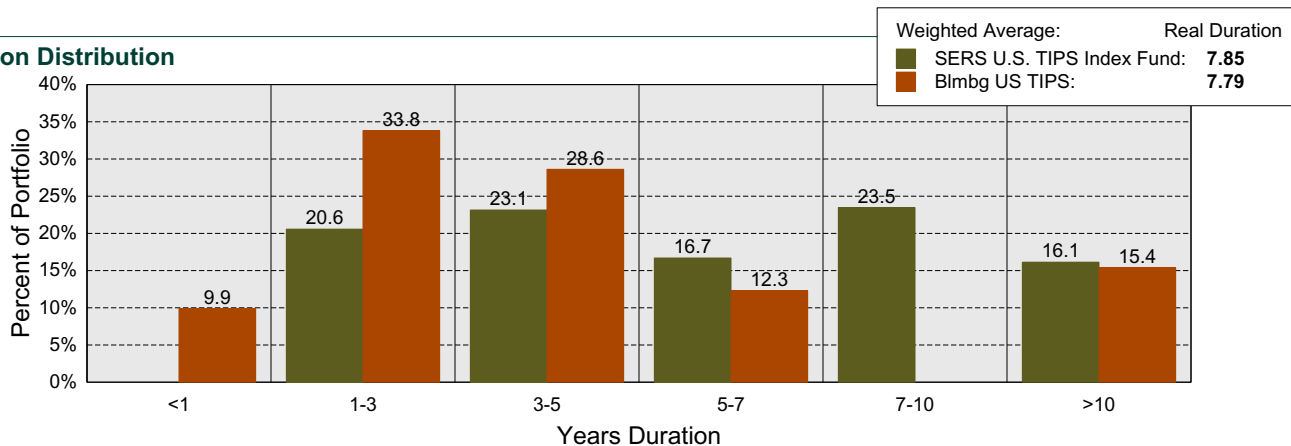
Portfolio Structure Comparison

The charts below compare the structure of the portfolio to that of the index from the three perspectives that have the greatest influence on return. The first chart compares the two portfolios across sectors. The second chart compares the duration distribution. The last chart compares the distribution across quality ratings.

Sector Distribution



Duration Distribution



Quality Distribution

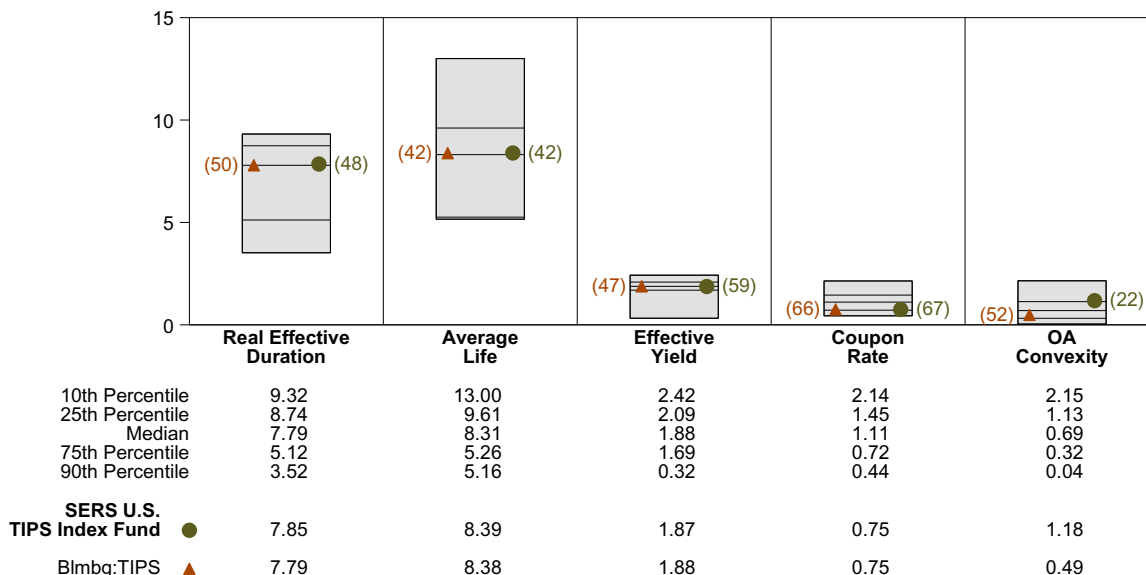


SERS U.S. TIPS Index Fund Bond Characteristics Analysis Summary

Portfolio Characteristics

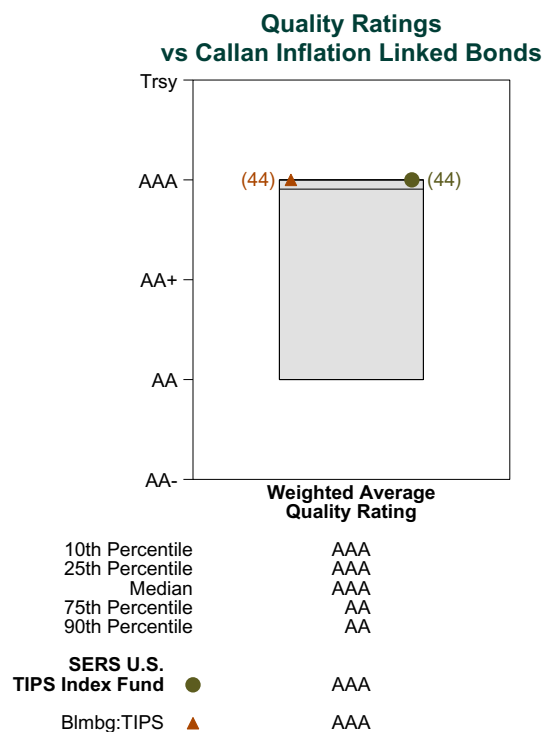
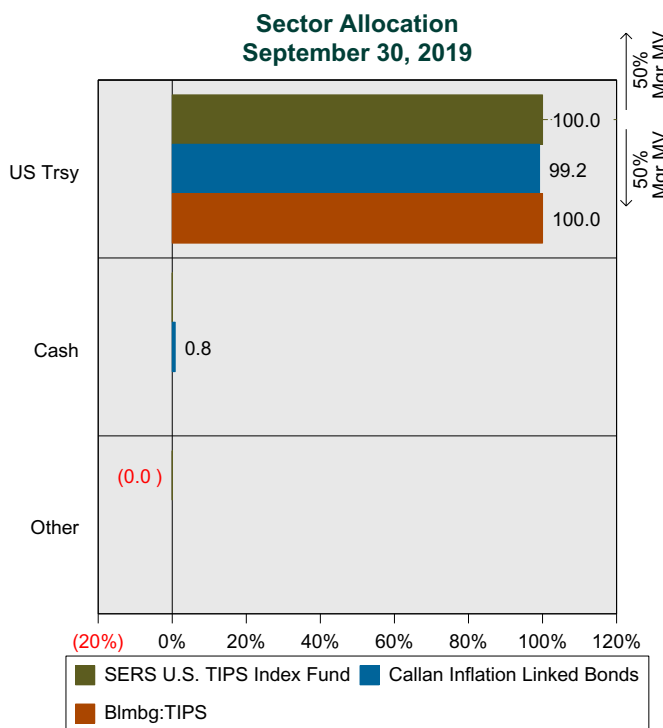
This graph compares the manager's portfolio characteristics with the range of characteristics for the portfolios which make up the manager's style group. This analysis illustrates whether the manager's current holdings are consistent with other managers employing the same style.

Fixed Income Portfolio Characteristics Rankings Against Callan Inflation Linked Bonds as of September 30, 2019



Sector Allocation and Quality Ratings

The first graph compares the manager's sector allocation with the average allocation across all the members of the manager's style. The second graph compares the manager's weighted average quality rating with the range of quality ratings for the style.



SERS U.S. Bond Index Fund

Period Ended September 30, 2019

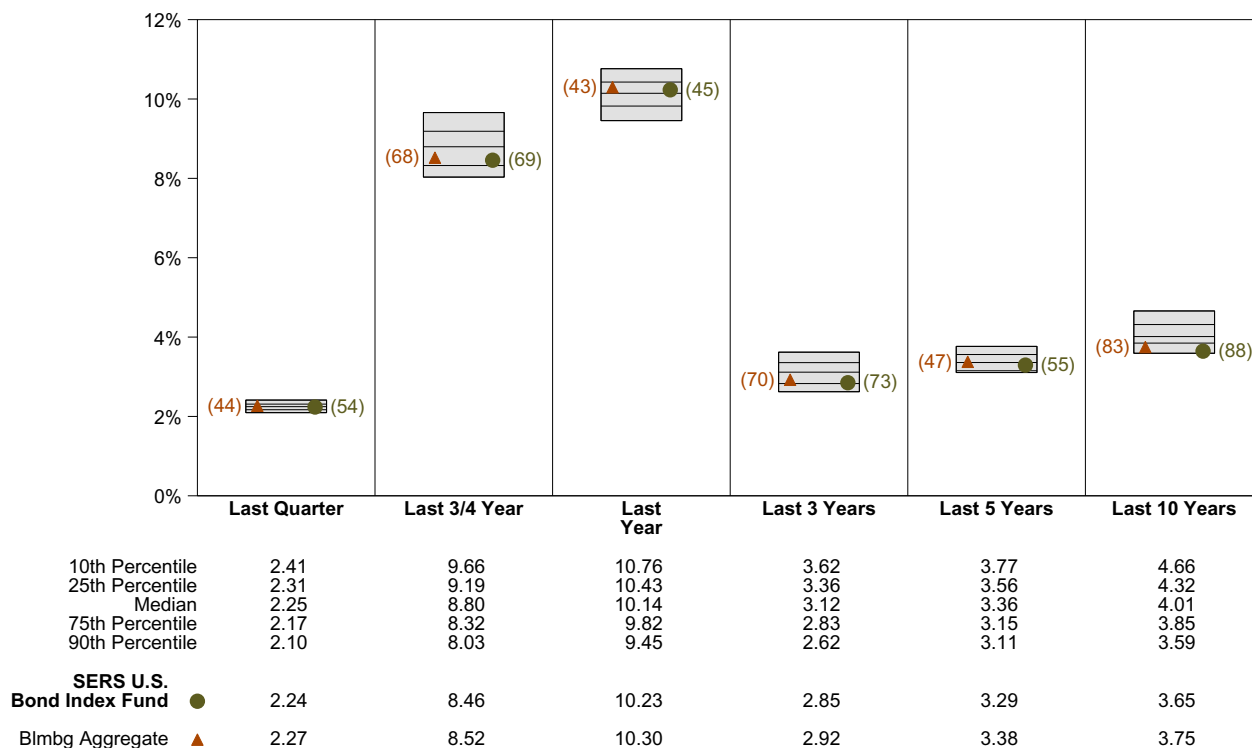
Investment Philosophy

The objective of the Fund is to track the performance of the Bloomberg US Aggregate Bond Index. In meeting this objective, the Fund may invest in securities (including those issued through private placements) and a combination of other collective funds that together are designed to track the performance of the Bloomberg US Aggregate Bond Index. This fund is managed by Mellon Capital Management.

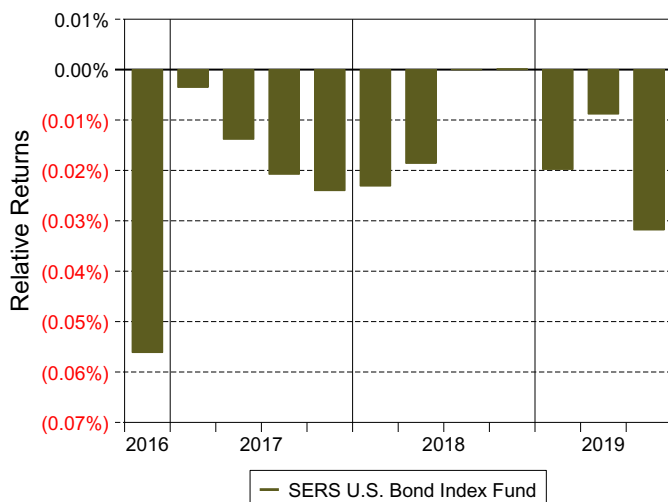
Quarterly Summary and Highlights

- SERS U.S. Bond Index Fund's portfolio posted a 2.24% return for the quarter placing it in the 54 percentile of the Callan Core Bond Mutual Funds group for the quarter and in the 45 percentile for the last year.
- SERS U.S. Bond Index Fund's portfolio underperformed the Blmbg Aggregate by 0.03% for the quarter and underperformed the Blmbg Aggregate for the year by 0.06%.

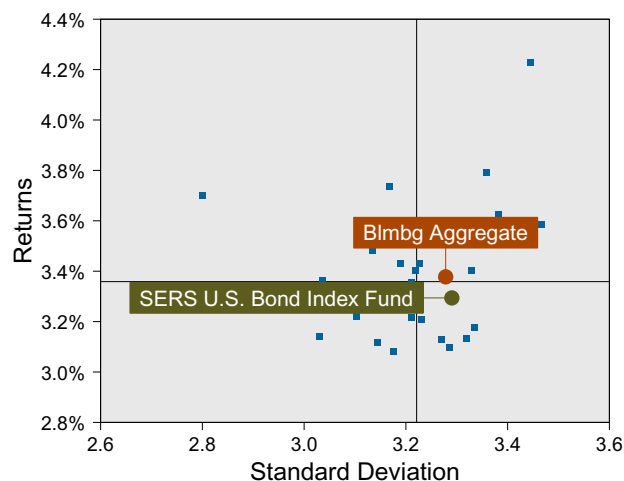
Performance vs Callan Core Bond Mutual Funds (Institutional Net)



Relative Return vs Blmbg Aggregate



Callan Core Bond Mutual Funds (Institutional Net) Annualized Five Year Risk vs Return

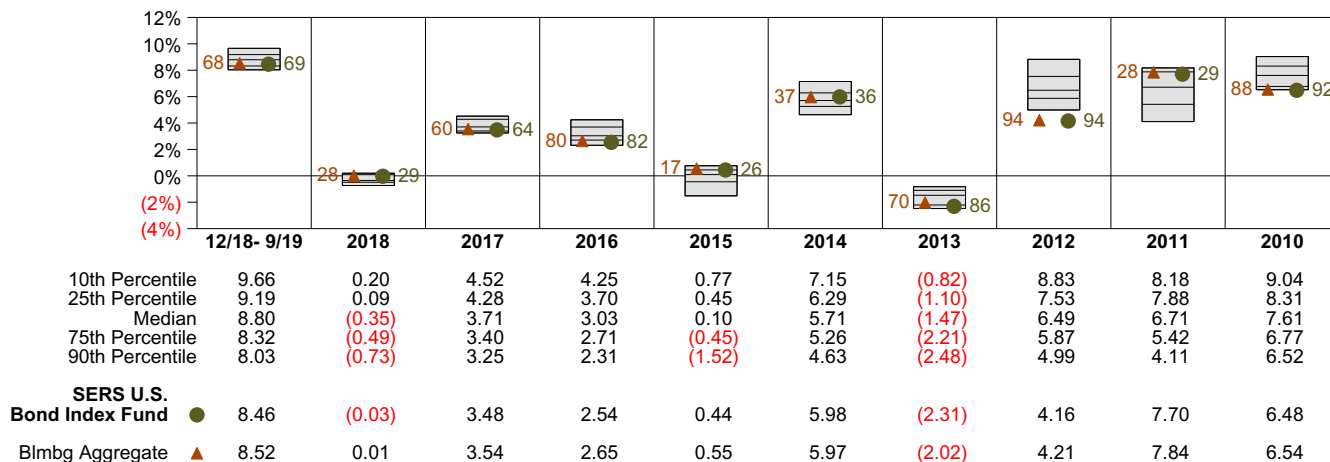


SERS U.S. Bond Index Fund Return Analysis Summary

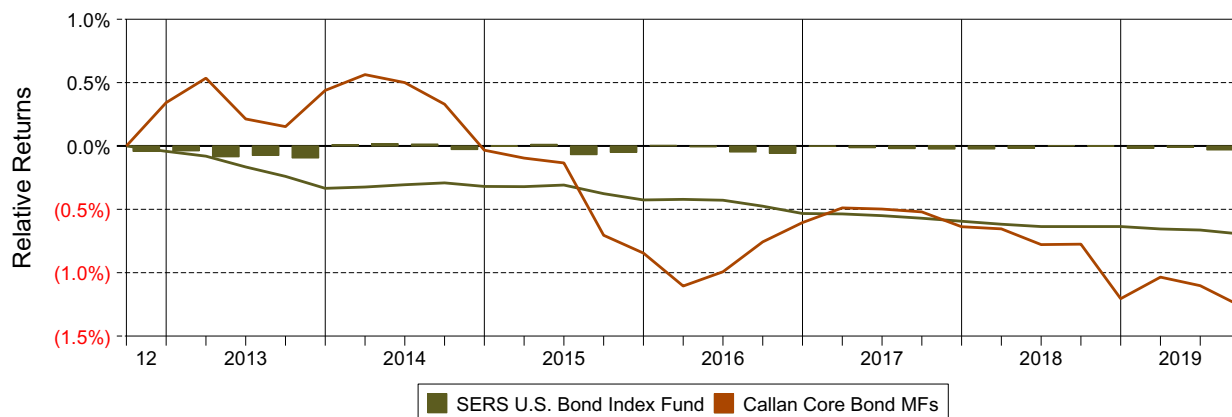
Return Analysis

The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate market benchmark. The last chart illustrates the manager's ranking relative to their style using various risk-adjusted return measures.

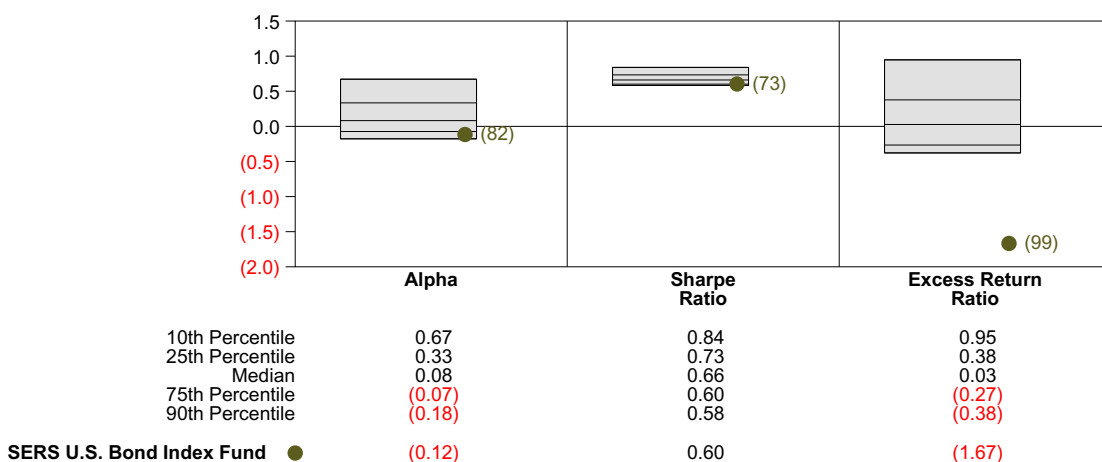
Performance vs Callan Core Bond Mutual Funds (Institutional Net)



Cumulative and Quarterly Relative Return vs Blmbg Aggregate



Risk Adjusted Return Measures vs Blmbg Aggregate Rankings Against Callan Core Bond Mutual Funds (Institutional Net) Seven Years Ended September 30, 2019



SERS U.S. Bond Index Fund

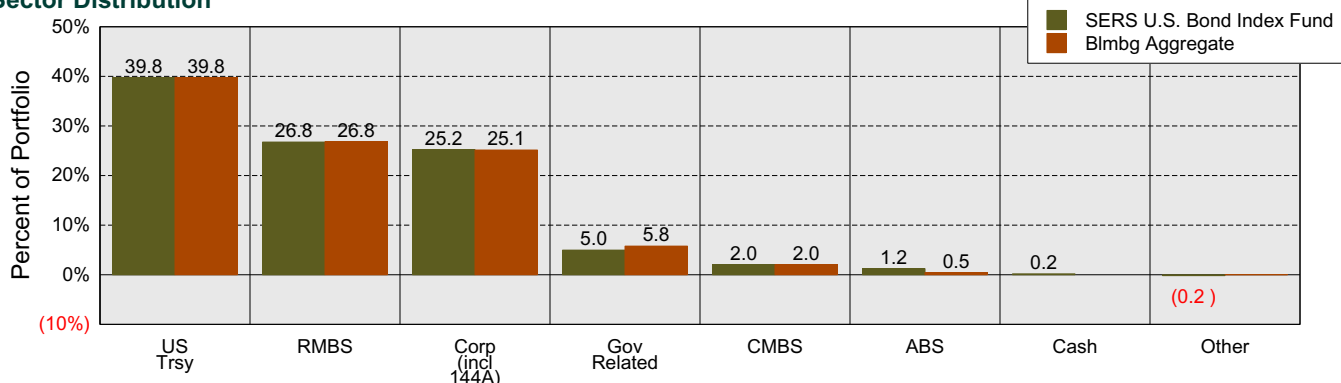
Portfolio Characteristics Summary

As of September 30, 2019

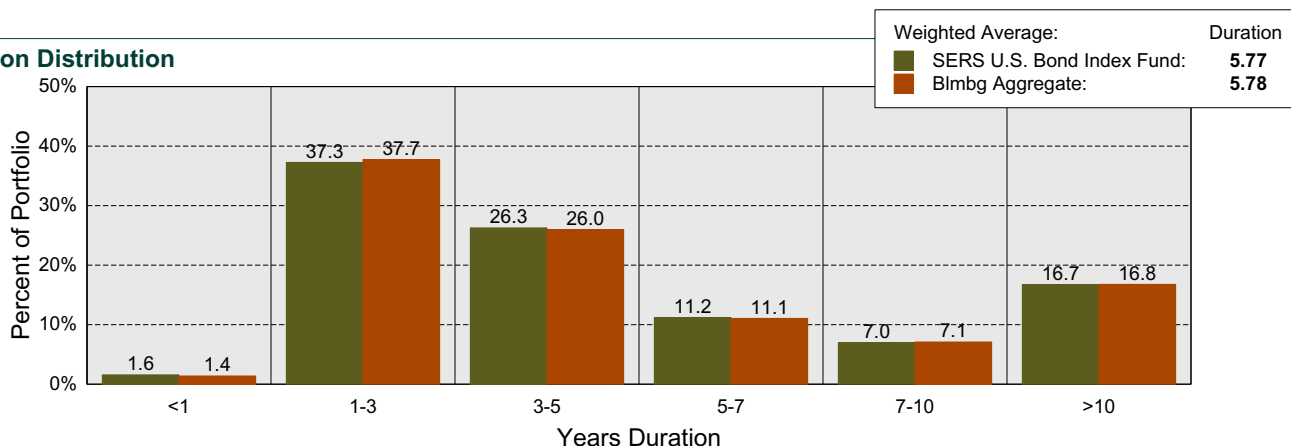
Portfolio Structure Comparison

The charts below compare the structure of the portfolio to that of the index from the three perspectives that have the greatest influence on return. The first chart compares the two portfolios across sectors. The second chart compares the duration distribution. The last chart compares the distribution across quality ratings.

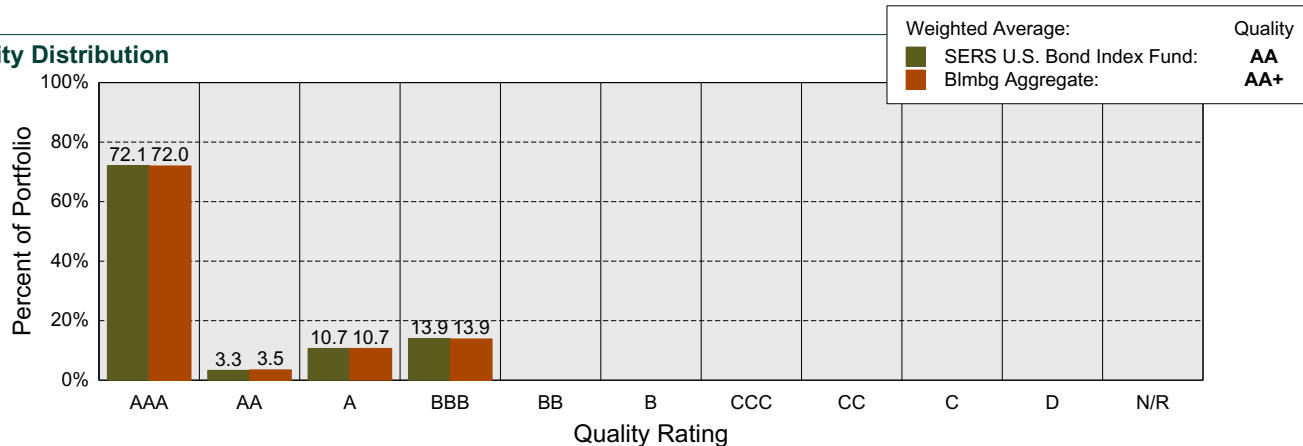
Sector Distribution



Duration Distribution



Quality Distribution



SERS U.S. Bond Index Fund

Bond Characteristics Analysis Summary

Portfolio Characteristics

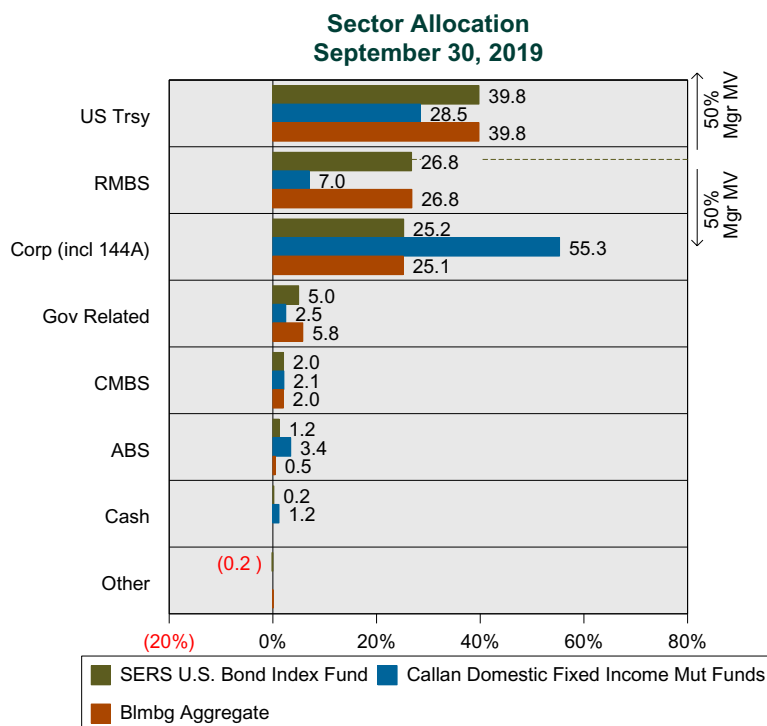
This graph compares the manager's portfolio characteristics with the range of characteristics for the portfolios which make up the manager's style group. This analysis illustrates whether the manager's current holdings are consistent with other managers employing the same style.

Fixed Income Portfolio Characteristics Rankings Against Callan Domestic Fixed Income Mut Funds as of September 30, 2019

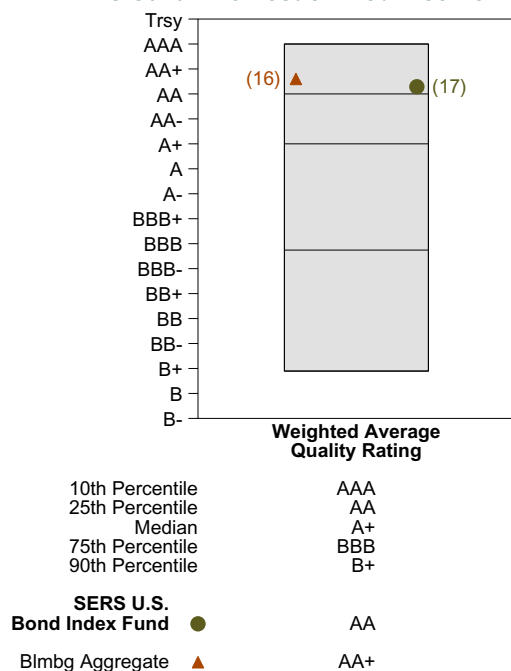


Sector Allocation and Quality Ratings

The first graph compares the manager's sector allocation with the average allocation across all the members of the manager's style. The second graph compares the manager's weighted average quality rating with the range of quality ratings for the style.



Quality Ratings vs Callan Domestic Fixed Income Mut Funds



Equity Market Indicators

The market indicators included in this report are regarded as measures of equity or fixed income performance results. The returns shown reflect both income and capital appreciation.

Standard & Poor's 500 Index is designed to measure performance of the broad domestic economy through changes in the aggregate market value of 500 stocks representing all major industries. The index is capitalization-weighted, with each stock weighted by its proportion of the total market value of all 500 issues. Thus, larger companies have a greater effect on the index.

Fixed Income Market Indicators

90-Day U.S. Treasury Bills provide a measure of riskless return. The rate of return is the average interest rate available on the beginning of each month for a Treasury Bill maturing in ninety days.

Bloomberg Barclays Aggregate Bond Index is a combination of the Mortgage Backed Securities Index and the intermediate and long-term components of the Government/Credit Bond Index.

International Equity Market Indicators

Morgan Stanley Capital International (MSCI) EAFE Index is composed of approximately 1000 equity securities representing the stock exchanges of Europe, Australia, New Zealand and the Far East. The index is capitalization-weighted and is expressed in terms of U.S. dollars.

Callan Databases

In order to provide comparative investment results for use in evaluating a fund's performance, Callan gathers rate of return data from investment managers. These data are then grouped by type of assets managed and by the type of investment manager. Except for mutual funds, the results are for tax-exempt fund assets. The databases, excluding mutual funds, represent investment managers who handle over 80% of all tax-exempt fund assets.

Equity Funds

Equity funds concentrate their investments in common stocks and convertible securities. The funds included maintain well-diversified portfolios.

Middle Capitalization - Mutual Funds who invest primarily in mid-range companies with market capitalizations between core equity companies and small capitalization companies. The average market capitalization is approximately \$7 billion. Invests in securities with greater volatility than the broader market as measured by the risk statistics Beta and Standard Deviation. The Middle Capitalization Style Group consists of the Middle Capitalization Growth Equity and the Middle Capitalization Value Equity Style Groups.

Fixed Income Funds

Fixed Income funds concentrate their investments in bonds, preferred stocks, and money market securities. The funds included maintain well-diversified portfolios.

Core Bond - Mutual Funds that construct portfolios to approximate the investment results of the Bloomberg Barclays Capital Government/Credit Bond Index or the Bloomberg Barclays Capital Aggregate Bond Index with a modest amount of variability in duration around the index. The objective is to achieve value added from sector and/or issue selection.

Balanced Funds

Balanced funds diversify their investments among common stocks, bonds, preferred stocks and money market securities. The funds included maintain well-diversified equity and fixed income portfolios.

Mutual Fund Balanced Funds - The Mutual Fund Balanced Fund Database consists of open-end mutual fund balanced products.

Risk/Reward Statistics

The risk statistics used in this report examine performance characteristics of a manager or a portfolio relative to a benchmark (market indicator) which assumes to represent overall movements in the asset class being considered. The main unit of analysis is the excess return, which is the portfolio return minus the return on a risk free asset (3 month T-Bill).

Alpha measures a portfolio's return in excess of the market return adjusted for risk. It is a measure of the manager's contribution to performance with reference to security selection. A positive alpha indicates that a portfolio was positively rewarded for the residual risk which was taken for that level of market exposure.

Beta measures the sensitivity of rates of portfolio returns to movements in the market index. A portfolio's beta measures the expected change in return per 1% change in the return on the market. If a beta of a portfolio is 1.5, a 1 percent increase in the return on the market will result, on average, in a 1.5 percent increase in the return on the portfolio. The converse would also be true.

Downside Risk stems from the desire to differentiate between "good risk" (upside volatility) and "bad risk" (downside volatility). Whereas standard deviation punishes both upside and downside volatility, downside risk measures only the standard deviation of returns below the target. Returns above the target are assigned a deviation of zero. Both the frequency and magnitude of underperformance affect the amount of downside risk.

Excess Return Ratio is a measure of risk adjusted relative return. This ratio captures the amount of active management performance (value added relative to an index) per unit of active management risk (tracking error against the index.) It is calculated by dividing the manager's annualized cumulative excess return relative to the index by the standard deviation of the individual quarterly excess returns. The Excess Return Ratio can be interpreted as the manager's active risk/reward tradeoff for diverging from the index when the index is mandated to be the "riskless" market position.

Information Ratio measures the manager's market risk-adjusted excess return per unit of residual risk relative to a benchmark. It is computed by dividing alpha by the residual risk over a given time period. Assuming all other factors being equal, managers with lower residual risk achieve higher values in the information ratio. Managers with higher information ratios will add value relative to the benchmark more reliably and consistently.

R-Squared indicates the extent to which the variability of the portfolio returns are explained by market action. It can also be thought of as measuring the diversification relative to the appropriate benchmark. An r-squared value of .75 indicates that 75% of the fluctuation in a portfolio return is explained by market action. An r-squared of 1.0 indicates that a portfolio's returns are entirely related to the market and it is not influenced by other factors. An r-squared of zero indicates that no relationship exists between the portfolio's return and the market.

Relative Standard Deviation is a simple measure of a manager's risk (volatility) relative to a benchmark. It is calculated by dividing the manager's standard deviation of returns by the benchmark's standard deviation of returns. A relative standard deviation of 1.20, for example, means the manager has exhibited 20% more risk than the benchmark over that time period. A ratio of .80 would imply 20% less risk. This ratio is especially useful when analyzing the risk of investment grade fixed-income products where actual historical durations are not available. By using this relative risk measure over rolling time periods one can illustrate the "implied" historical duration patterns of the portfolio versus the benchmark.

Residual Portfolio Risk is the unsystematic risk of a fund, the portion of the total risk unique to the fund (manager) itself and not related to the overall market. This reflects the "bets" which the manager places in that particular asset market. These bets may reflect emphasis in particular sectors, maturities (for bonds), or other issue specific factors which the manager considers a good investment opportunity. Diversification of the portfolio will reduce or eliminate the residual risk of that portfolio.

Risk/Reward Statistics

Rising Declining Periods refer to the sub-asset class cycles vis-a-vis the broader asset class. This is determined by evaluating the cumulative relative sub-asset class index performance to that of the broader asset class index. For example, to determine the Growth Style cycle, the S&P 500 Growth Index (sub-asset class) performance is compared to that of the S&P 500 Index (broader asset class).

Sharpe Ratio is a commonly used measure of risk-adjusted return. It is calculated by subtracting the "risk-free" return (usually 3 Month Treasury Bill) from the portfolio return and dividing the resulting "excess return" by the portfolio's risk level (standard deviation). The result is a measure of return gained per unit of risk taken.

Sortino Ratio is a downside risk-adjusted measure of value-added. It measures excess return over a benchmark divided by downside risk. The natural appeal is that it identifies value-added per unit of truly bad risk. The danger of interpretation, however, lies in these two areas: (1) the statistical significance of the denominator, and (2) its reliance on the persistence of skewness in return distributions.

Standard Deviation is a statistical measure of portfolio risk. It reflects the average deviation of the observations from their sample mean. Standard deviation is used as an estimate of risk since it measures how wide the range of returns typically is. The wider the typical range of returns, the higher the standard deviation of returns, and the higher the portfolio risk. If returns are normally distributed (ie. has a bell shaped curve distribution) then approximately 2/3 of the returns would occur within plus or minus one standard deviation from the sample mean.

Total Portfolio Risk is a measure of the volatility of the quarterly excess returns of an asset. Total risk is composed of two measures of risk: market (non-diversifiable or systematic) risk and residual (diversifiable or unsystematic) risk. The purpose of portfolio diversification is to reduce the residual risk of the portfolio.

Tracking Error is a statistical measure of a portfolio's risk relative to an index. It reflects the standard deviation of a portfolio's individual quarterly or monthly returns from the index's returns. Typically, the lower the Tracking Error, the more "index-like" the portfolio.

Treynor Ratio represents the portfolio's average excess return over a specified period divided by the beta relative to its benchmark over that same period. This measure reflects the reward over the risk-free rate relative to the systematic risk assumed.

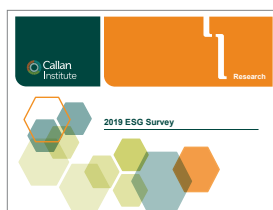
Note: Alpha, Total Risk, and Residual Risk are annualized.

Research and Educational Programs

The Callan Institute provides research to update clients on the latest industry trends and carefully structured educational programs to enhance the knowledge of industry professionals. Visit www.callan.com/library to see all of our publications, and www.callan.com/blog to view our blog "Perspectives." For more information contact Barb Gerraty at 415-274-3093 / institute@callan.com.

New Research from Callan's Experts

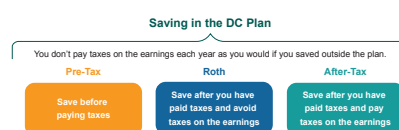
DTS Offers Some Key Advantages for Evaluating Fixed Income Portfolios | This paper describes duration times spread (DTS), which measures systematic credit-spread risk exposure. DTS estimates the return of any bond, by percentage, if its spread were to change from the current level, all else equal. DTS offers several advantages for monitoring risk in credit portfolios over other methods.



2019 ESG Survey | Callan's seventh annual survey assessing the status of environmental, social, and governance (ESG) investing in the U.S. institutional investment market.

Callan's DC Index in Detail | A video about the Callan DC Index™: why we started it, what it measures, and how it can benefit defined contribution plan sponsors.

DC Plan Hacks: Tips for an Efficient Design | Defined contribution



plan sponsors should regularly evaluate their plans to make sure they serve the organization's

benefits philosophy. When evaluating changes, the sponsor should consider its demographics, cost of benefits, vendor capabilities, impact on nondiscrimination testing, communication capabilities, and legal requirements.

2019 June Workshop Summary: In the Age of Illiquidity | For many nonprofits and defined benefit plans, the shift to higher-returning but less liquid asset classes has myriad implications. This summary discusses how consultants, institutional investors, and investment managers can work together to identify solutions tailored to each plan.

The Keys to Unlocking Private Equity Portfolio Assessment

Private equity performance evaluation has some unique considerations, so return calculations and benchmarking methodologies differ from public securities. Closed-end private equity vehicles are assessed using ratio analyses and internal rate of return (IRR) measures. Using performance metrics, private equity portfolios can be evaluated at the partnership level, at the vintage year level, and then at the total portfolio level.

Survivorship Bias and the Walking Dead | Survivorship bias, the predisposition to evaluate a data set by focusing on the "survivors" rather than also examining the record of non-survivors, is important to understand for hedge fund peer groups, which tend to have a relatively large number of constituents that disappear. Using a proprietary approach, Callan is able to adjust peer group comparisons for survivorship bias. This better-informed perspective enables a more honest assessment in considering performance relative to other opportunities.

Quarterly Periodicals

Private Equity Trends | A newsletter on private equity activity, covering both the fundraising cycle and performance over time.

Market Pulse Flipbook | A market reference guide covering trends in the U.S. economy, developments for institutional investors, and the latest data for U.S. and non-U.S. equities and fixed income, alternatives, and defined contribution plans.

Active vs. Passive Charts | This series of charts compares active managers alongside relevant benchmarks over the long term.

Capital Market Review | A newsletter providing analysis and a broad overview of the economy and public and private market activity each quarter across a wide range of asset classes.

Events

Miss out on a Callan conference or workshop? Event summaries and speakers' presentations are available on our website: www.callan.com/library/

Please mark your calendar and look forward to upcoming invitations.

2020 National Conference

Celebrating the 40th anniversary of the Callan Institute
January 27-29, 2020 – San Francisco

Please also keep your eye out for upcoming Webinars in 2019! We will be sending invitations to register for these events and will also have registration links on our website at www.callan.com/webinarsupcoming.

For more information about events, please contact Barb Gerraty: 415-274-3093 / gerraty@callan.com

The Center for Investment Training Educational Sessions

The Center for Investment Training, better known as the “Callan College,” provides a foundation of knowledge for industry professionals who are involved in the investment decision-making process. It was founded in 1994 to provide clients and non-clients alike with basic- to intermediate-level instruction.

Introduction to Investments

April 21-22, 2020
July 21-22, 2020

This program familiarizes institutional investor trustees and staff and asset management advisers with basic investment theory, terminology, and practices. It lasts one-and-a-half days and is designed for individuals who have less than two years of experience with asset-management oversight and/or support responsibilities. Tuition for the Introductory “Callan College” session is \$2,350 per person. Tuition includes instruction, all materials, breakfast and lunch on each day, and dinner on the first evening with the instructors.

Learn more at www.callan.com/events/callan-college-intro

Education: By the Numbers

525 Attendees (on average) of the Institute's annual National Conference

50+ Unique pieces of research the Institute generates each year

3,700 Total attendees of the “Callan College” since 1994

1980 Year the Callan Institute was founded



“Research is the foundation of all we do at Callan, and sharing our best thinking with the investment community is our way of helping to foster dialogue to raise the bar across the industry.”

Greg Allen, CEO and Chief Research Officer

Confidential – For Callan Client Use Only

The list below is an important component of our conflicts management and disclosure process. It identifies those investment managers that pay Callan fees for educational, consulting, software, database or reporting products and services. We update the list quarterly because we believe that our fund sponsor clients should know the investment managers that do business with Callan, particularly those investment manager clients that the fund sponsor clients may be using or considering using. Please note that if an investment manager receives a product or service on a complimentary basis (e.g. attending an educational event), they are not included in the list below. Callan is committed to ensuring that we do not consider an investment manager's business relationship with Callan, or lack thereof, in performing evaluations for or making suggestions or recommendations to its other clients. Please refer to Callan's ADV Part 2A for a more detailed description of the services and products that Callan makes available to investment manager clients through our Institutional Consulting Group, Independent Adviser Group and Fund Sponsor Consulting Group. Due to the complex corporate and organizational ownership structures of many investment management firms, parent and affiliate firm relationships are not indicated on our list.

Manager Name	Actual	Target
Mr. A. Smith	85	90
Ms. B. Jones	92	88
Mr. C. Brown	78	82
Ms. D. White	88	92
Mr. E. Black	82	85
Ms. F. Green	95	90
Mr. G. Grey	80	85
Ms. H. Blue	87	90
Mr. I. Yellow	75	80
Ms. J. Purple	90	88
Mr. K. Red	83	87
Ms. L. Orange	86	90
Mr. M. Silver	79	83
Ms. N. Gold	91	89
Mr. O. Bronze	84	86
Ms. P. Copper	89	91
Mr. Q. Iron	77	81
Ms. R. Steel	93	90
Mr. S. Aluminum	81	84
Ms. T. Titanium	88	90
Mr. U. Carbon	76	80
Ms. V. Silicon	94	92
Mr. W. Plastic	82	85
Ms. X. Rubber	87	90
Mr. Y. Glass	79	82
Ms. Z. Ceramic	90	88

[illegible]

[illegible]

Manager Name	Actual	Target
Manager A	85	90
Manager B	78	82
Manager C	92	88
Manager D	88	95
Manager E	75	80
Manager F	82	85
Manager G	90	92
Manager H	70	75
Manager I	85	88
Manager J	78	82
Manager K	92	90
Manager L	88	95
Manager M	75	80
Manager N	82	85
Manager O	90	92
Manager P	70	75
Manager Q	85	88
Manager R	78	82
Manager S	92	88
Manager T	88	95
Manager U	75	80
Manager V	82	85
Manager W	90	92
Manager X	70	75
Manager Y	85	88
Manager Z	78	82
Manager AA	92	90
Manager AB	88	95
Manager AC	75	80
Manager AD	82	85
Manager AE	90	92
Manager AF	70	75
Manager AG	85	88
Manager AH	78	82
Manager AI	92	88
Manager AJ	88	95
Manager AK	75	80
Manager AL	82	85
Manager AM	90	92
Manager AN	70	75
Manager AO	85	88
Manager AP	78	82
Manager AQ	92	88
Manager AR	88	95
Manager AS	75	80
Manager AT	82	85
Manager AU	90	92
Manager AV	70	75
Manager AW	85	88
Manager AX	78	82
Manager AY	92	88
Manager AZ	88	95
Manager BA	75	80
Manager BB	82	85
Manager BC	90	92
Manager BD	70	75
Manager BE	85	88
Manager BF	78	82
Manager BG	92	90
Manager BH	88	95
Manager BI	75	80
Manager BJ	82	85
Manager BK	90	92
Manager BL	70	75
Manager BM	85	88
Manager BN	78	82
Manager BO	92	88
Manager BP	88	95
Manager BQ	75	80
Manager BR	82	85
Manager BS	90	92
Manager BT	70	75
Manager BU	85	88
Manager BV	78	82
Manager BW	92	88
Manager BX	88	95
Manager BY	75	80
Manager BZ	82	85
Manager CA	90	92
Manager CB	70	75
Manager CC	85	88
Manager CD	78	82
Manager CE	92	88
Manager CF	88	95
Manager CG	75	80
Manager CH	82	85
Manager CI	90	92
Manager CJ	70	75
Manager CK	85	88
Manager CL	78	82
Manager CM	92	90
Manager CN	88	95
Manager CO	75	80
Manager CP	82	85
Manager CQ	90	92
Manager CR	70	75
Manager CS	85	88
Manager CT	78	82
Manager CU	92	88
Manager CV	88	95
Manager CW	75	80
Manager CX	82	85
Manager CY	90	92
Manager CZ	70	75
Manager DA	85	88
Manager DB	78	82
Manager DC	92	88
Manager DD	88	95
Manager DE	75	80
Manager DF	82	85
Manager DG	90	92
Manager DH	70	75
Manager DI	85	88
Manager DJ	78	82
Manager DK	92	90
Manager DL	88	95
Manager DM	75	80
Manager DN	82	85
Manager DO	90	92
Manager DP	70	75
Manager DQ	85	88
Manager DR	78	82
Manager DS	92	88
Manager DT	88	95
Manager DU	75	80
Manager DV	82	85
Manager DW	90	92
Manager DX	70	75
Manager DY	85	88
Manager DZ	78	82
Manager EA	92	88
Manager EB	88	95
Manager EC	75	80
Manager ED	82	85
Manager EE	90	92
Manager EF	70	75
Manager EG	85	88
Manager EH	78	82
Manager EI	92	90
Manager EJ	88	95
Manager EK	75	80
Manager EL	82	85
Manager EM	90	92
Manager EN	70	75
Manager EO	85	88
Manager EP	78	82
Manager EQ	92	88
Manager ER	88	95
Manager ES	75	80
Manager ET	82	85
Manager EU	90	92
Manager EV	70	75
Manager EW	85	88
Manager EX	78	82
Manager EY	92	88
Manager EZ	88	95